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TAXONOMY OF *GALACTIA* (FABACEAE) IN THE USA

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ABSTRACT

Galactia in the USA includes 21 species; 13 of these occur in Florida but only 3 are strictly endemic to the state; 9 occur in Texas. *Galactia regularis* (L.) B.S.P. is the species widespread across the eastern USA with twining stems, broadly elliptic leaflets, and relatively small flowers, while *G. volubilis* (L.) Britt. (with *G. macreei* M.A. Curtis and *G. glabella* Michx. as synonyms) is the mostly coastal plain species with twining stems but narrower leaflets and larger flowers — this application of *G. regularis* and *G. volubilis* essentially agrees with W.H. Duncan' assessment in 1979. *Galactia brachypoda* Torr. & Gray is the correct name for the widespread Atlantic coast species with procumbent (mostly non-twining) stems and relatively large flowers. *Galactia grisebachii* Urb. is interpreted here as the name of the twining, linear-leaflet plants of southmost Florida previously identified as *G. parvifolia* A. Rich. **Galactia joselyniae** Nesom, **sp. nov.**, occurs in Brewster and Jeff Davis counties, Texas, and in Coahuila, Mexico. Lectotypes are designated for *Galactia canescens* Benth., *Galactia floridana* var. *longeracemosa* Vail, *Galactia prostrata* Small, *Galactia sessiliflora* Torr. & Gray, *Galactia stenophylla* Urb., and *Glycine striata* Jacq. A key to species is provided, as well as a typification summary, brief morphological and ecological description, and county-level distribution map for each species.

Galactia P. Browne (Phaseoleae, Diocleinae) is estimated here to include at least 111 species (see tally in Appendix, provided here because of significant underestimates in previous accounts), most native to the Americas, distributed among South America, Central America, West Indies, Mexico, and the southeastern and south-central USA, with the greatest concentrations in South America and the USA. Diversity in the USA is concentrated in Florida and in Texas. Four *Galactia* species are native to Asia, Australia, and Africa, including *G. tenuiflora* (Willd.) Wight & Arn., which apparently occurs natively in all three areas. Chen et al. (2010) described the range of *G. tenuiflora* as southern China, Taiwan, India, Malaysia, Philippines, Sri Lanka, Thailand, Vietnam, and Africa. *Galactia tashiroi* Maxim. is endemic to Taiwan and the Ryukyu Islands of Japan.

Taxonomic studies of *Galactia* have been completed relatively recently for Argentina and neighboring countries (Burkart 1971), Venezuela (Torres et al. 1983), Brazil (Ceolin 2011; Ceolin & Miotto 2013), and Cuba (Beyra Matos et al. 2005) and various regional floras have included substantial numbers of species. In the USA, the first study devoted solely to *Galactia* was by Vail (1895), who included 14 species. Small (1933) included 14 species for the southeastern USA; Duncan (1979) recognized 8 for the same area. Ward and Hall (2004) recognized 11 species for Florida, and Isely's overview (1998) for the USA included 17. Significant disagreement over species concepts and nomenclature has characterized the USA studies — Isely in 1998 (p. 563) noted that "Herbarium annotations remain author-idiosyncratic and chaotic."

Galactia encompasses a wide diversity of habit, root and rhizome structure, leaf venation, inflorescence structure, and floral morphology. It is characterized by the following features: plants herbaceous perennials, mostly procumbent to sprawling or twining-climbing vines, less commonly erect; leaves mostly 1- or 3-foliolate, less commonly 5–7(–9)-foliolate (imparipinnate); flowers in axillary and/or terminal "pseudoracemes" or "racemoid panicles," each flower with 1 bract and 2 bracteoles (Tucker 1987, 2003; Prenner 2012); calyces 4-lobed, two upper lobes fused into one; corollas red to purplish, pink, bluish, or white; stamens diadelphous or pseudomonadelphous, with the

vexillary stamen free or connate from middle downward; and ovaries sessile to stipitate, fruits dehiscent, with seeds transverse to oblique in the fruit.

Burkart (1971) recognized three sections within *Galactia*, emphasizing the South American species. Most *Galactia* species, including all of those in the USA and treated in the study, are placed in sect. *Odonia* sensu Burkart.

Sect. **Galactia** TYPE: *G. pendula* Pers., West Indies

Vines, without rhizomes. Leaves 3-foliolate. Corollas 16–26 mm long, glabrous, petals narrow. Stamens diadelphous. Burkart recognized *G. lindenii* Burkart from Colombia also as a member of sect. *Galactia*; various other West Indian species apparently also would be placed here, at least technically, following Urban's key (1900), e.g., *G. rubra* Urb., which has long corollas with red petals, like *G. pendula*.

Sect. **Odonia** (Bertol.) Burkart TYPE: *Odonia tomentosa* Bertol., a synonym of *G. striata*

Odonia Bertol.

Procumbent to climbing vines, or erect; rhizomes present or absent. Leaves 1-, 3-, or 5–7(–9)-foliolate. Corollas most less than 16 mm long, glabrous, petals relatively broader. Stamens diadelphous with vexillary stamen free, rarely pseudomonadelphous with vexillary stamen connate from middle downward.

Sect. **Collaearia** (Benth.) Burkart TYPE: *G. peduncularis* (Benth.) Taub.

Collaea sect. *Collaearia* Benth.

Erect subshrubs, rarely viney; rhizomes present, lignescent. Leaves 1- or 3-foliolate. Corollas mostly less than 16 mm long, standard sericeous on outer surface, petals relatively wide. Stamens often pseudomonadelphous (approaching the genus *Camptosema* Hook. & Arn.). Burkart recognized 13 species in sect. *Collaearia*, mainly from Brazil.

Galactia forms a group in the subtribe Diocleinae together with 3 or 4 other genera: *Camptosema* Hook. & Arn. (10 species, South America), *Lackeya* Fortunato et al. (1 species, USA; Maxwell 1979; Fortunato et al. 1996), and *Collaea* DC. (7 species, South America; Fortunato 1995; Ceolin & Miotto 2009). Maxwell & Taylor (2003) included the Caribbean *Rhodopis* Urb. (2 species; Judd 1984) in their *Galactia* clade. Preliminary phylogenetic studies indicate that *Galactia* is not monophyletic (Queiroz et al. 2003; Sede et al. 2008, 2009; Ceolin 2011), but relatively few species have yet been included in analyses. Tentatively, *Galactia* appears to be paraphyletic without the inclusion of some *Camptosema* species and perhaps the whole genus *Collaea*. Also, tentatively, Burkart's sections do not appear to be monophyletic.

Maxwell (1979) transferred the eastern North American *Dioclea multiflora* (Torr. & Gray) C. Mohr into *Galactia*; Fortunato et al. (1996) segregated *D. multiflora* as the monospecific genus *Lackeya*. This species apparently has not yet been included in molecular-phylogenetic analyses but it appears to be morphologically out of place in *Galactia*.

GALACTIA P. Browne, Civ. Nat. Hist. Jamaica, 298. 1756. **TYPE**: *Galactia pendula* Pers.

Derivation: Greek, *galaktos*, milk; alluding to the "milky" branches of the original species, (*Galactia pendula* Pers. 1807 = *Clitoria galactia* L.). Referring to the earlier phrase name ("Phaseolus minor lactescens") in Hans Sloane's catalogue of Jamaican plants, Browne noted that this plant "is easily distinguished by its long reddish flowers, **milky branches**, and smooth leaves." The stems of *G. pendula* and some other species apparently produce a milky sap, but none of those in the USA do so.

Heterocarpaea Scheele, Linnaea 21: 467. 1848. **TYPE**: *H. texana* Scheele (= *Galactia texana*).
Odonia Bertoloni, Lucubr. Herb., 35. 1822. **TYPE**: *O. tomentosa* Bertoloni (= *Galactia striata*).

Perennial herbs [subshrubs, rarely shrubs], from rhizomes, an elongate taproot, or a fusiform taproot. **Stems** procumbent or twining and climbing. **Leaves** mostly 1- or 3-foliolate, less commonly 5-foliolate or 7(–9)-foliolate; stipules small, deciduous or persistent; stipels persistent. **Inflorescences** pseudoracemes, axillary [terminal], pedunculate or without an axis and flowers in axillary fascicles, sometimes axillary and of a single flower; rachis with slightly swollen nodes; bracts small, setaceous; bracteoles minute. **Flowers** pedicellate, solitary, paired, or in fascicles of 2–3 at rachis nodes, axillary when peduncle and rachis absent; each flower with 1 bract and 2 bracteoles, deltoid, lanceolate or subulate. **Calyx** campanulate, lobes 5 appearing as 4 (upper 2 comletely connate), linear to lanceolate, longer than the tube, lateral slightly smaller, lowest often longest. **Corolla** purplish to bluish or pink [red]; petals subequal in length; banner orbicular to ovate or obovate-orbicular, margin slightly inflexed or appendaged, apex rounded; wings narrow or obovate, adherent to keel; keel obtuse and almost straight, subequal to or longer than wings. **Stamens** 10, diadelphous [pseudomonadelphous]; vexillary stamen free or connate from middle downward. **Ovary** subsessile; style filiform, glabrous; stigma small, capitate, terminal; nectary at ovary base. **Legumes** linear, laterally compressed, straight or weakly to strongly falcate, with false septae between seeds, elastically dehiscent. **Seeds** 1–12, estrophiolate. **Base chromosome number**, x = 10.

Ca. 111 species — see accounting in APPENDIX (21 in the USA): native to the USA, Mexico, Central America, West Indies, South America, Africa, Asia, Australia.

KEY TO SPECIES OF TEXAS, NEW MEXICO, AND ARIZONA

1. Leaflets 1 ..... 1. **Galactia marginalis**
1. Leaflets 5 or 3.

2. Leaflets 5 ..... 3. **Galactia heterophylla**
2. Leaflets 3.

3. Stems erect, not twining, usually alternately bent at nodes; inflorescence subsessile, 1–6-flowered ..... 15. **Galactia erecta**
3. Stems procumbent or twining-climbing; inflorescence pedunculate, 1-flowered if sessile or subsessile.

4. Stems procumbent, not twining, commonly producing filiform rhizomes at the nodes, these producing subterranean flowers and 1-seeded fruits ..... 18. **Galactia canescens**
4. Stems climbing-twining or at least proximally prostrate then distally twining, without rhizomes at nodes, without subterranean flowers and fruits.

5. Stems at least proximally procumbent, sometimes then distally twining.

6. Leaflets broadly oblong to suborbicular; flowers **flowers solitary and axillary or 2–8 in a pseudoraceme, corollas 6–8** mm long ..... 16. **Galactia joselyniae**
6. Leaflets **oblong-elliptic to elliptic-ovate; flowers (2–)5–18(–30) in a pseudoraceme,** corollas **11–12 mm long** ..... 17. **Galactia wrightii**

5. Stems usually climbing, twining proximally and distally.

7. Flowers 1–5, solitary and pedicellate or 2–5 on inflorescence axis 1–12(–40) mm; fruits falcate ..... 19. **Galactia texana**
7. Flowers 1–8(–16), solitary and pedicellate or 2–8(–16) on inflorescence axis 10–150(–280) mm; fruits straight.

11. Leaflets **narrowly oblong to oblong-lanceolate**, 25–75 mm x **6–14 mm**; fruits 35–65 mm long, seeds 12–15 ..... 12. **Galactia longifolia**
11. Leaflets as below, (10–)12–40(–50) mm x **5–21(–25)** mm; seeds 5–11.

12. Leaflets mostly elliptic to broadly elliptic, (5–)10–21(–25) mm wide; stems moderately to densely hirsute to hirsute-villous with spreading-deflexed hairs ..... 13. **Galactia regularis**
12. Leaflets mostly oblong to lanceolate-oblong, 5–15(–17) mm wide; stems sparsely to moderately strigose with tightly to loosely appressed, retrorse hairs, sometime glabrate..... 14. **Galactia volubilis**

KEY TO SPECIES OF THE USA

1. Leaflets 1 ..... 1. **Galactia marginalis**
1. Leaflets 3 or 5–3.

2. Leaflets 5–9

3. Leaflets 5–9; flowers white, 3–11 and distally positioned on the inflorescence axis; Florida, Georgia, South Carolina ..... 2. **Galactia elliottii**
3. Leaflets 5; flowers pink to purple, purple-red, or deep lavender, solitary and axillary; Texas ..... 3. **Galactia heterophylla**

2. Leaflets 3.

4. Stems mostly erect, not twining, usually alternately bent at nodes; inflorescence subsessile, 1–6-flowered ..... 15. **Galactia erecta**
4. Stems procumbent or climbing-twining, not bent at nodes; inflorescence pedunculate, 1-flowered if sessile or subsessile.

5. Stems procumbent at least proximally and not twining, twining or weakly twining distally in some.

6. Plants commonly producing filiform rhizomes at the nodes, these producing subterranean flowers and 1-seeded fruits ..... 18. **Galactia canescens**
6. Plants without rhizomes at nodes, without subterranean flowers and fruits.

7. Calyx lobes brown to reddish brown on inner surface when dry; corollas distinctly dark reddish when dry, persisting after withering, sometimes still present when fruit is mature ..... 6. **Galactia mollis**
7. Calyx lobes greenish-yellow to tan on inner surface when dry; corollas light whitish to blue, pinkish, or purplish when dry, not persisting after anthesis.

8. Leaflets subcoriaceous to coriaceous, venation raised on both surfaces.

9. Leaflets mostly linear-oblong or narrowly oblong, 2–8(–11) mm wide; Florida only ..... 15. **Galactia pinetorum**
9. Leaflets elliptic, oblanceolate-elliptic, oblong-elliptic, elliptic-lanceolate, or broadly lanceolate, (4–)7–25(–32) mm wide; Florida, Alabama, Georgia, South Carolina, North Carolina, Virginia.

10. Internodes only a little longer to usually shorter than the largest leaflet of adjacent nodes, hairs on stems 0.05–0.25 mm long; leaflets (4–)7–10(–18) mm wide; flowers solitary and axillary or 2–4 ..... 7. **Galactia minor**
10. Several to most internodes (especially those toward the base) longer than the largest leaflet of adjacent nodes, hairs on the stem 0.1–0.8 mm long; leaflets (4–)10–25(–32) mm wide; flowers (3–)5–15(–25), rarely 1–2 ..... 8. **Galactia brachypoda**

8. Leaflets herbaceous, venation not raised.

11. Stems loosely strigose; Texas, New Mexico, and Arizona.

12. Leaflets broadly oblong to suborbicular; flowers **flowers solitary and axillary or 2–8, corollas 6–8 mm** ..... 16. **Galactia joselyniae**
12. Leaflets **oblong-elliptic to elliptic-ovate; flowers (2–)5–18(–30), corollas 11–12 mm** ..... 17. **Galactia wrightii**

11. Stems tomentose to hirsute-villous or hirsute; se USA.

13. Leaflets (14–)20–55 x (10–)15–35 mm; flowers 5–12(–25) 9. **Galactia floridana**
13. Leaflets 8–30 x 5–20 mm; flowers solitary and axillary or 2–6.

14. Inflorescence axis (5–)20–60(–90) mm; calyces 6–7 mm; corollas 12–15 mm; southern Florida ..... 10. **Galactia smallii**
14. Inflorescence axis 10–20 mm; calyces 3–4 mm; corollas 6–7 mm; panhandle Florida and adjacent southern Alabama ..... 11. **Galactia microphylla**

5. Stems climbing or sprawling, twining.

15. Corollas 11–14(–15) mm; stems loosely strigose with short, loosely appressed, retrorse hairs, strongly lignescent ..... 5. **Galactia fasciculata**
15. Corollas 7–11 mm; stems strigose to hirsute or hirsute-pilose, herbaceous to weakly lignescent or (*G. striata*) strongly lignescent.

16. Banner striped with white lines; localities coastal and near-coastal . 4. **Galactia striata**
16. Banner not striped; localities inland to coastal.

17. Fruits falcate; flowers 1–5, solitary and pedicellate or 2–5 on inflorescence axis 1–4(–40) mm ..... 19. **Galactia texana**
17. Fruits straight; flowers 1–8(–16), solitary and pedicellate or 2–8(–16) on inflorescence axis 10–150(–280) mm.

18. Stems strigose with antrorse hairs; leaflets linear-oblong to narrowly oblong or narrowly elliptic, 2–4(–6) mm wide; Florida only ..... 21. **Galactia grisebachii**
18. Stems strigose to hirsute or hirsute-villous with spreading-deflexed to retrorse hairs; leaflets oblong to elliptic or lanceolate, 5–21(–25) mm wide; Texas only or broadly distributed in the se USA.

19. Leaflets narrowly oblong to oblong-lanceolate, 6–14 mm wide; fruits 35–65 mm long, seeds 12–15; Texas only ..... 12. **Galactia longifolia**
19. Leaflets as below, 5–21(–25) mm wide; seeds 5–11; se USA including Texas.

20. Leaflets mostly elliptic to broadly elliptic, (5–)10–21(–25) mm wide; stems moderately to densely hirsute to hirsute-villous with spreading-deflexed hairs; corollas 7–10 mm ..... 13. **Galactia regularis**
20. Leaflets mostly oblong to lanceolate-oblong, 5–15(–17) mm wide; stems moderately to sparsely strigose with tightly to loosely appressed, retrorse hairs, sometime glabrate; corollas 9–14 mm 14. **Galactia volubilis**

1. **GALACTIA MARGINALIS** Benth., Ann. Wiener Mus. Naturgesch. 2: 126. 1838. **LECTOTYPE** (Burkart 1971, p. 717): **USA. Texas**. No other data, *T. Drummond 145* (US [ex herb. Univ. Lausanne] digital image!; isolectotype: W digital image!). Bentham cited "In Mexico Karwinsky. -- Texas, Drummond." The lectotype chosen by Burkart is a tiny plant with only two leaves, perhaps just a fragment of a fuller specimen at LAU.

Cologania heterophylla Gillies ex Hook., Bot. Misc. 3: 181. 1833. *Galactia heterophylla* (Gillies ex Hook.) Vail, Bull. Torrey Bot. Club 22: 502. 1895 [nom. illeg., preceded by *Galactia heterophylla* A. Gray 1850]. **LECTOTYPE** (Burkart 1971, p. 750): **ARGENTINA. [Córdoba.]** El Rio Cuarto, W side Las Pampas, [ca. 1820], *J. Gillies s.n.* (K 502879 digital image!; isolectotype: E digital image!). Also cited was "Monte Video, Tweedie" — this specimen apparently mounted on the same sheet as the lectotype.

Perennial herbs, arising from a short, ovoid-fusiform tuber sometimes producing slender rhizomes or rhizome-like caudex branches from the apex. **Stems** procumbent, not twining, lignescent, sparsely to moderately short-strigose with retrorse hairs. **Leaflets** 1, blades narrowly elliptic to narrowly lanceolate, 25–85 x 4–10(–16) mm, coriaceous, not glaucous abaxially, completely glabrous, veins closely reticulate and strongly raised, thickened marginal vein completely encircling the whole margin, apices rounded to obtuse. **Inflorescence** of axillary, solitary flowers. **Calyces** 5–6 mm, short-strigose. **Corollas** 13–15 mm, pink to purple, purple-red, or deep lavender. **Fruits** 25–35 mm x 5–7 mm, straight, short-strigose with closely appressed hairs. **Seeds** (5–)7–9.

Flowering (Feb–)Apr–Oct. Oak-juniper woodland, blackjack-post oak woods, coastal prairie, sand, sandy loam, gravelly hillsides, ditch banks; 2–200 m; Tex.; Mexico (Coahuila, Tamaulipas); South America (Argentina, Brazil, Paraguay, Uruguay). Map 1; Mexican distribution not shown.

Galactia marginalis is characterized by its procumbent stems, glabrous, 1-foliolate leaves with closely reticulate, raised venation and a completely encircling marginal vein, and large, solitary, axillary flowers.

Burkart (1971, p. 751) described *Galactia marginalis* var. *columbiana* Burkart, the type from Cundinamarca, Colombia (*H. García Barriga 10.966*, COL 000061229 digital image!), between the population systems of *G. marginalis* in Texas and southern South America. This collection and others in COL from Colombia similar to it have been identified as *G. glaucescens* Kunth by L.K. Ruiz B. in 2004 — *G. glaucescens* typically and characteristically is 3-foliolate but *G. glaucescens* var. *obtusa* (Benth.) Burkart is 1-foliolate and Ceolin and Miotto (2013) noted in the comments regarding typical *G. glaucescens* in Brazil that variation in leaflet number occurs, sometimes even on a single plant.

2. **GALACTIA ELLIOTTII** Nutt., Gen. N. Amer. Pl. 2: 117. 1818. **TYPE: USA. South Carolina.** Protologue: "Hab. In South Carolina.—S. Elliott, Esqr." South Carolina, no other data, presumably collected by *S. Elliott s.n.* (holotype: BM digital image!). The label in Nuttall's hand says "Galactia elliotii, S. Carol." A historic specimen of *G. elliotii* at PH is from Florida, collected by Baldwin.

Galactia elliottii var. *leavenworthii* Torrey & Gray, Fl. N. Amer. 1(4): 687. 1840. **TYPE: USA. Florida.** Protologue: "East Florida, Dr. Leavenworth." Not currently databased among types at NY or GH; not located at GH.

Perennial herbs, taproot slender and fusiform, producing long, white rhizomes that at intervals produce shoots as well as slender, adventitious, fusiform roots ("extremely long, narrow, subsurface root-runners, which at intervals send up a climbing shoot" (*Kral 4870*, Marion Co., Fla.). **Stems** procumbent and trailing at least proximally, often climbing-twining distally, strigose with loosely appressed hairs. **Leaflets** (5–)7(–9), blades elliptic to oblong-elliptic, oblong-lanceolate or

elliptic-oblanceolate, 17–39 x 6–21 mm, herbaceous, dark above, lighter beneath but not glaucous, sparsely strigose abaxially, veins not raised, sparsely strigose to scabrous adaxially, apices obtuse to rounded or shallowly retuse. **Inflorescence** axis 50–150 mm, flowers 3–11, on distal 1/2–1/5 of axis, sometimes fasciculate on the raceme. **Calyces** 7–9 mm, loosely strigose. **Corollas** 11–14 mm, white. **Fruits** 30–45 x 10–14 mm, loosely strigose to strigose-hirsute. **Seeds** 3–7.

Flowering May–Aug. Pine-live oak flats, slash pine flats, sand pine, marshes and marsh edges, peat bogs, ditches, roadsides, spoil areas, marl, sandy peat, white sand; 5–50 m; Fla., Ga., S.C. Map 2; some records added for this exceptionally distinct species from specimens not examined.

Galactia erecta is distinct in its pinnate leaves (leaflets 5–9) with coriaceous, dark-drying leaflets, large white flowers distally positioned on the inflorescence axis, and broad fruits.

3. **GALACTIA HETEROPHYLLA** A. Gray, Boston J. Nat. Hist. 6: 171. 1850. **TYPE: USA. Texas.** [Kimble, Llano, or Mason Co.:] On the Llano, Oct 1847, *F.J. Lindheimer Fasc. IV. 591* (holotype: GH digital image!; isotypes: GH 66215, 66216; isotypes: A, BRIT!, MICH, NY, P-3 sheets, PH-2 sheets, SI, SMU!, TEX!, US — digital images of all from all herbaria!).

Galactia grayi Vail, Bull. Torrey Bot. Club 22: 503. 1895 [nom. illeg., with *Galactia heterophylla* A. Gray cited in synonymy]. **TYPE: USA. Texas.** [Kimble, Llano, or Mason Co.:] On the Llano, Oct 1847, *F.J. Lindheimer Fasc. IV. 591* (holotype: NY; isotypes: see *G. heterophylla* A. Gray).

Vail used the name *Galactia heterophylla* (Gillies) Vail for the species now identified as *G. marginalis* Benth. (she cited *G. marginalis* in synonymy) — her intention apparently was to provide a 'correct' name for *Galactia heterophylla* A. Gray, using the same type as Gray and citing *G. heterophylla* A. Gray as a synonym, apparently under the supposition that her own *Galactia heterophylla*, based on *Cologania heterophylla* Gillies ex Hook. (1833), had priority over Gray's *G. heterophylla*. Gray, however (1840, p. 687), was aware that *Cologania heterophylla* was conspecific with *Galactia marginalis*.

Perennial herbs, arising from a very slender, elongate, woody taproot, also sometimes with rhizomes or rhizome-like caudex branches from the root apex. **Stems** procumbent, not twining, densely strigose with closely appressed, retrorse hairs. **Leaflets** 5, blades elliptic or broadly elliptic to elliptic-obovate or oblong-elliptic, 6–24 x 2–12 mm, herbaceous, glabrous adaxially or rarely sparsely strigose, margins strigose, smooth-glaucous abaxially and moderately strigose with closely appressed hairs, veins not raised, apices obtuse to rounded or shallowly retuse. **Inflorescence** axis 1–10 mm, flowers solitary and axillary or 2–5 in a reduced pseudoraceme. **Calyces** 7–9 mm, short-strigose with closely appressed hairs. **Corollas** 11–15 mm, pink, deep pink, cerise, rose-purple, lavender, purple, violet-red. **Fruits** (20–)30–45 x 5–7 mm, straight, moderately strigose with closely appressed hairs. **Seeds** 3–5.

Flowering (Mar–)Apr–Sep. Mesquite brush, blackbrush-cenizo brush, openings in live oak-thorn scrub, granite slopes, limestone ridges, roadsides, caliche outcrops, sandy prairies, hard-packed sand, sandy silt, sandy clay, gravelly sandy loam; 10–150 m; Tex.; Mexico (Coahuila, Nuevo León, Tamaulipas). Map 3; Mexican distribution not shown.

Galactia heterophylla is characterized by its procumbent, non-twining stems and particularly by its 5 leaflets with glabrous adaxial surfaces.

4. **GALACTIA STRIATA** (Jacq.) Urb., Symb. Antill. 2: 320. 1900. *Glycine striata* Jacq., Hort. Bot. Vindob. 1: 32, t. 76. 1771. **TYPE: HISPANIOLA(?).** Protologue: "Planta ... in horti caldario germinavit anno 1770 e femine ex America torrida a me allato. Regionis nomen adnotare neglexi." **LECTOTYPE** (designated here): Hort. Bot. Vindob. 1: plate 76. 1771. Figure 1.

Figure 1. Lectotype of *Glycine striata* Jacq., Hort. Bot. Vindob. 1: plate 76. 1771.

Nicolaus Joseph von Jacquin explored in the West Indies and in Venezuela and Colombia between 1755 and 1759. "Though he did prepare some dried plant specimens, it is not thought Jacquin brought back sizeable collections of these as they are rarely found in European herbaria. Joseph Banks acquired some Jacquin material, but those sheets in the Banks herbarium at BM are only scrappy and few" (BM-JSTOR 2013). JSTOR-PLANTS shows the following as possible types of *Glycine striata*: BM000589649, *Hans Sloane, s.n.*; BM000589647, *William Houston, s.n.*; LINN-HS1217-12, *Anonymous s.n.*; LINN-HL901-17, *Joseph Franz Jacquin 114*.

Burkart (1971, p. 719), following a personal communication from Dr. Velva Rudd at US, noted that the type of *Glycine striata* was at BM — it was said by Rudd to be the same specimen used to trace the original drawing. Neither the Sloane nor Houston collection (as cited above) at BM fits that description, however. Beyra M. et al. (2005, p. 489) and Ceolin and Miotto (2013, p. 12) cited a Bertero collection from Santo Domingo as the type (*Bertero 457*-BM, as "holotypus," Beyra et al.; *Bertero s.n.*-F, as "holotype," Ceolin & Miotto), but Carlo Bertero (1789-1831) did not explore in the West Indies until 1816-1821, considerably after Jacquin's publication. The lengthy and detailed description of *Glycine striata* in the Hortus Botanicus Vindobonensis protologue was said by Jacquin to be drawn from living plants grown around 1770 in the botanical garden at Vienna (where Jacquin wrote the text), and the illustration (t. 76) is best considered the lectotype and perhaps the only original material. It might be possible that the LINN specimen from Joseph Franz Jacquin (son of N.J. Jacquin) was from material grown in Vienna, but presumably there is no way of confirming this.

An epitype for *Galactia striata* will need to be provided by whoever undertakes a broader study of the complex. The Hortus Botanicus Vindobonensis illustration does not show details of vestiture, a significant feature in distinguishing among potential segregates.

Galactia cubensis Kunth, Nov. Gen. Sp. (quarto ed.) 6: 429. 1823. **TYPE: CUBA.** Protologue: "Crescit in Insulae Cubae, prope Havanam." Havana, no date, *Bonpland & Humboldt s.n.* (presumable holotype: P digital image!).

Galactia berteroana DC., Prodr. 2: 238. 1825. *Galactia striata* var. *berteroana* (DC.) Urb., Symb. Antill. 2(2): 322. 1900. **TYPE: PUERTO RICO.** Protologue: "in Porto-Ricco. (Bertero)." The original spelling of the epithet was "berteriana," corrected here to "berteroana," an adjective alluding to C.L.G. Bertero, collector of the type.

Galactia spiciformis Torrey & Gray, Fl. N. Amer. 1(2): 288. 1838. **TYPE: USA. Florida.** [Monroe Co.:] Key West, no date, *Rev. Alva Bennett s.n.* (holotype: GH 66217 digital image!; possible isotype: NY 8142 digital image!). The NY specimen, collected at Key West by "Mr. Bennett," is perhaps an isotype (it has been annotated as "Type"), but the protologue specifies the collector as "Rev. Alva Bennett," as on the GH sheet.

Perennial herbs, from an elongate woody taproot. **Stems** climbing-twining, often high-climbing, strongly lignescent, densely hirsute-pilose. **Leaflets** 3, blades elliptic to lanceolate-elliptic or ovate-elliptic, broadly elliptic, (20–)32–70 x 9–40(–50) mm, herbaceous, hirsute on both surfaces with erect to ascending hairs, veins not raised, apices rounded to obtuse or subacute. **Inflorescence** axis (70–)100–280 mm, flowers 10–20(–38) in pseudoracemes on distal 2/3–4/5 of axis, often fasciculate on the raceme. **Calyces** 5–7 mm, strigose. **Corollas** 8–11 mm, lavender, bluish, pink-purple, purple, pink, banner striped with white lines, auricled or not. **Fruits** 30–60 x 6–8 mm, straight, vestiture. **Seeds** 5–12.

Flowering all year. Hammocks, mangroves, thickets, scrubland, beaches, roadsides; 0–20 m; Fla.; West Indies, Mexico, Central America, South America. Map 4.

Galactia striata and *G. spiciformis* sometimes have both been recognized in Florida and in the West Indies, but putative distinctions observed between them have varied.

Florida (Long & Lakela 1971)
1. Leaflets ovate-lanceolate, to 6 cm long; stems and leaflets densely villous; standard strongly auriculate ..... **Galactia spiciformis**
1. Leaflets elliptic, 2–5 cm long; stems and leaflets sparingly pubescent; standard nearly truncate ..... **Galactia striata**

Bahamas (Correll & Correll 1982)
1. Leaflets typically broadly ovate-elliptic and >5 cm long, somewhat leather in texture ..... **Galactia spiciformis**
1. Leaflets typically ovate to narrowly oval and usually <5 cm long, chartaceous to membranaceous in texture ..... **Galactia striata**

Hispaniola (Liogier 1985)
1. Leaflets coriaceous or strongly chartaceous; peduncles bearing flowers from base to apex, sometimes very short ..... **Galactia spiciformis**
1. Leaflets membranous to chartaceous; peduncles without flowers on the proximal half **Galactia striata**

Cuba (Beyra M. et al. 2005)
1. Flowers in racemes, peduncles ca. 15 cm long, generally bearing flowers from base to apex; whole plant appressed-pubescent with white to bright yellow hairs ..... **Galactia spiciformis**
1. Flowers in racemes or solitary or few at axils, peduncles 3–15 long, without flowers on the proximal 1/4–1/2; the whole plant tomentose to scarcely strigose-pilose with white-opaque hairs ..... **Galactia striata**

Most Florida botanists (and including Isely 1998) have treated *Galactia striata* more broadly, including *G. spiciformis* as a synonym, and in the present study, I am not able to consistently distinguish two separate entities among the Florida plants, based on any of the criteria outlined in the key couplets above. The Cuban entity with distinctive vestiture identified as *G. spiciformis* (Beyra M. et al. 2005) apparently does not occur in Florida.

Burkart (1971) recognized three varieties within *Galactia striata*: var. *striata* and var. *tenuiflora* (Klein ex Willd.), both widespread and widely sympatric, and var. *crassirachis* Burkart, endemic to Argentina. At least seven other varieties have been recognized, as well as various synonyms at specific rank, and this variable complex needs study before evolutionary morpho-geographic patterns are clearly evident. Because *G. tenuiflora* Klein ex Willd. is treated as a distinct species in many accounts and is widely distributed, it is here considered distinct from *G. striata* in the accounting of number of species (see Appendix). Wiggins and Porter (1971) treated *G. dubia* DC. as a synonym of *G. tenuiflora* in the Galapagos flora.

5. **GALACTIA FASCICULATA** Vail, Bull. Torrey Bot. Club 22: 505. 1895. *Galactia volubilis* var. *fasciculata* (Vail) Ward & Hall, Phytologia 86: 69. 2004. **TYPE: USA. Florida.** [Hillsborough Co.:] Tampa, climbing on small shrubs, 24 Aug 1895, *G.V. Nash 2480* (holotype: NY 8083 digital image!; isotypes: AC digital image!, MSC digital image!, NDG digital image!, NEB digital image!, NY 8084 digital image!, OS digital image!, P-2 sheets digital images!, US digital image!). Vail noted that the type was in "Herb. Columbia College" — that specimen is NY 8083, as cited here.

Galactia floridana var. *longeracemosa* Vail, Bull. Torrey Bot. Club 22: 505. 1895. **LECTOTYPE** (designated here): **USA. Florida.** No other locality data, 1889, *J.H. Simpson s.n.* (US 4569-66799 digital image!; isotypes: MU, US-2 sheets digital images!).

Galactia volubilis var. *baltzelliana* Ward & Hall, Phytologia 86: 68. 2004. **TYPE: USA. Florida.** Lake Co.: 1 mi. N of Leesburg, turkey oak-longleaf pine left in vacant lots, climbing and twining over and into shrubs and trees at 1505 Moss Avenue, 25 Sep 1975, *D.W. Hall 413* (holotype: FLAS 151164 digital image!; isotypes: FLAS 151162 and 151163 digital images!)

Perennial herbs, from a woody taproot. **Stems** high-climbing, twining, strongly lignescent, loosely strigose with short, loosely appressed, retrorse hairs. **Leaflets** 3, blades elliptic, broadly elliptic or suborbicular, (12–)25–45(–64) x 10–30(–39) mm, coriaceous, adaxially glabrous and dark-colored, abaxially short-strigulose and lighter, veins not raised, apices rounded to obtuse, sometimes retuse. **Inflorescence** axis (10–)30–160 mm, flowers (3–)6–25, fasciculate in pseudoracemes along distal 1/2–3/4 of rachis. **Calyces** 6–7 mm, sparsely minutely strigose to glabrate. **Corollas** 11–14(–15) mm, lavender or purplish to pinkish. **Fruits** 30–60 x 4–6 mm, straight, densely short-strigose to strigose-sericeous with loosely appressed hairs. **Seeds** 5–9.

Flowering (Jun–)Jul–Sep. Sand-pine scrub, dunes and hills with sand pine-oak, oak-hickory, scrubby flatwoods, river banks with live oak, longleaf pine, and saw palmetto, disturbed areas; 10–30 m; Fla. Map 5.

Galactia fasciculata is distinguished by its strongly lignescent, twining and high-climbing stems with densely and loosely retrorse-strigose vestiture, coriaceous leaves dark and glossy above, and relatively short inflorescences with large flowers. It has sometimes been identified as *G. floridana* but the latter is completely distinct from *G. fasciculata* in its procumbent habit, tomentose to hirsute-villous stems, persistently hairy adaxial leaf surfaces, elongate inflorescences with distally positioned flowers, and villous calyces. There is no evidence of hybridization or intermediacy between *G. fasciculata* and *G. regularis*, as seemingly implied by Ward and Hall (2004).

6. **GALACTIA MOLLIS** Michx., Fl. Bor.-Amer. 2: 61. 1803. **TYPE: USA**. Protologue: "HAB. in Carolina inferiore." No label data (probable holotype: P, cat. P00798742 digital image!).

Galactia pilosa Nutt., Gen. N. Amer. Pl. 2: 116. 1818. **TYPE: USA. Georgia**. Protologue: "Hab. In Georgia and Carolina." Georgia, no other data, *T. Nuttall s.n.* (holotype: PH 25556 digital image!; isotype: BM 1042768 digital image!). The PH sheet has a label in Nuttall's hand as "Galactia *pilosa, Georgia." Another sheet at BM (digital image!), collected in Arkansas and identified as *Galactia pilosa* by Nuttall, is *Galactia regularis* in the sense of the present study; the BM sheet is not a type.

Elliott (1824, p. 238-239) has sometimes been credited with authorship of *Galactia pilosa*. He identified the species as "2. Pilosa ? Nutt.," providing a reference to Nuttall's publication but noting that "I feel by no means certain that this is the plant of Mr. Nuttall."

Perennial herbs, from an elongate taproot. **Stems** procumbent and trailing at least proximally, often weakly climbing-twining distally, hirsute to villous-hirsute with spreading to slightly upcurved or slightly to strongly deflexed hairs, veins not raised, apices rounded to obtuse. **Leaflets** 3, blades narrowly to broadly oblong to elliptic-oblong, elliptic, or ovate, (20–)25–50 x 10–30 mm, herbaceous, loosely strigose to pilose or villous on both surfaces. **Inflorescence** axis (3–)5–15(–20) mm, flowers 6–10 usually on distal 1/2–1/4 of axis, often fasciculate on the raceme. **Calyces** 5–8, densely villous. **Corollas** 7–10 mm, purplish-pink to red or rose-purple, drying distinctly dark reddish. **Fruits** 25–35 x 4–5 mm, straight, loosely densely strigose-sericeous to villous-sericeous. **Seeds** 7–12.

Flowering May–Jul. Longleaf pine savanna, turkey oak, pine barrens, sandhills, sandy roadsides; 20–100 m; Ala., Fla., Ga., Miss., N.C., S.C. Map 6 (records not seen from NC and SC added from Wilbur 1968; abundant records of *Galactia mollis* in Mississippi and Alabama databases based on misidentifications).

7. **GALACTIA MINOR** Duncan, Phytologia 37: 59. 1977. **TYPE: USA. Georgia**. Long Co.: Sandhills adjacent to Altamaha River bottom SW of Ludowici, 2 Aug 1953, *W.H. Duncan 16993* (holotype: GA; isotype: VDB!).

Perennial herbs, arising from an elongate, cylindric, woody taproot. **Stems** procumbent, trailing, not twining, densely short-strigulose with minute, antrorsely closely appressed hairs; internodes about as long as longest leaflet of the adjacent nodes. **Leaflets** 3, blades elliptic, oblanceolate-elliptic, oblong-elliptic, (7–)9–25(–30) x (4–)7–10(–18) mm, subcoriaceous, glabrous adaxially, sparsely strigose abaxially and lighter colored but not glaucous, veins raised on both surfaces, apices rounded to slightly retuse, rarely acute. **Inflorescence** axis (5–)10–20(–35) mm, flowers solitary and axillary or 2–4 in a reduced pseudoraceme. **Calyces** 7–10 mm, strigose. **Corollas** 11–17 mm, pink. **Fruits** 25–45 x 4–5 mm, straight, strigose. **Seeds** 3–8.

Flowering Jun–Aug(–Oct). Sandhills and sandy ridges, roadsides, pine flats, pine-scrub oak, turkey oak, longleaf pine; 0–100 m; Ala., Fla., Ga., Miss., N.C., S.C. Map 7.

Galactia minor is a distinct species with procumbent, antrorsely strigulose stems, small, congested leaves with glabrous adaxial surfaces and raised venation, few flowers on a short inflorescence axis, and relatively large corollas.

8. **GALACTIA BRACHYPODA** Torr. & Gray, Fl. N. Amer. 1(2): 288. 1838. **TYPE: USA. Florida.** Protologue: "Dry pine barrens, Middle Florida, Dr. Chapman!" Dry barrens, no date, *A.W. Chapman s.n.* (holotype: NY 8088 digital image!, Figure 2; probable isotype: NY 8090 digital image). Another Chapman collection at NY has been tentatively identified as *G. brachypoda* (8089) — but it is *G. erecta*, which perhaps accounts for the placement of *G. brachypoda* in some accounts as a synonym of *G. erecta* (e.g., Vail described and keyed *G brachypoda* as having an erect habit). It also presumably accounts for why Isely (1998, p. 566) thought the type was so aberrant ("probably either a freak form of *G. erecta* or an exceptionally rare hybrid with one of the viny species") — if not, the basis of his statement is not clear.

Galactia purshii Desv., Ann. Sci. Nat. (Paris) 9: 413. 1826 [nom. illeg.]. Desvaux observed that "*Galactia glabella* DECAND., Prod., 2, p. 238, excl. syn." was a "confused species" and apparently somehow hoped to reduce the confusion by providing the new name, noting only that "La phrase diagnostique de l'auteur du Prodrome est suffisante." DeCandolle (Prodr. 2: 238. 1825), however, clearly attributed the name to Michaux and the Prodromus description fits Michaux's concept as well as the associated type specimen.

Galactia mollis Michx. var. *nashii* Vail ex Small, Fl. S.E. U.S., 720. 1933. **TYPE: USA. Florida.** Lake Co.: Vicinity of Eustis, high pine land, Jul 1894, *G.V. Nash 880* (holotype: NY 8093 digital image!). Following the description of *G. mollis*, Small (p. 720) noted that "G. mollis Nashii Vail has stem only lightly pubescent." The name was not included in Vail's treatment, but the NY specimen was annotated in pencil by "A.M.V." (Anna Marie Vail) as "G. mollis Nashii n. var.?"

Perennial herbs, from an elongate, narrowly fusiform to cylindric, woody taproot. **Stems** procumbent, creeping, not rooting at nodes, sometimes weakly twining distally, minutely strigose with retrorsely appressed hairs or with antrorsely appressed hairs. **Leaflets** 3, elliptic to elliptic-lanceolate or broadly lanceolate to oblong-elliptic, sometimes linear-elliptic in se N.C. to ne Ga., (8–)15–45(–60) x (4–)10–25(–32) mm, subcoriaceous, adaxially glabrous to sparsely short-strigose or minutely hirtellous and darker, slightly glossy or not, abaxially moderately to densely short-strigose with closely appressed hairs, lighter green but not glaucous, veins slightly but distinctly raised adaxially or on both surfaces, apices obtuse to rounded or shallowly retuse. **Inflorescence** axis (5–)20–80(–150) mm; flowers (3–)5–15(–25), rarely 1–2, in pseudoracemes on distal 3/4 of shorter axes or usually on distal 1/4–1/5 of longer axes, often fasciculate on the raceme distally. **Calyces** 5–7 mm, sparsely strigose to glabrate. **Corollas** 11–15 mm, lavender or violet to purplish, bright pink, or pinkish.

Figure 2. Holotype of *Galactia brachypoda* Torrey & Gray. The habit is procumbent and essentially non-twining. Leaflets vary in shape from relatively narrow (as in the holotype) to more broadly elliptic.

Fruits (25–)30–60 x 4–5(–6) mm, straight, densely strigose to strigose-sericeous, glabrescent. **Seeds** (3–)5–8(–12).

Flowering (Mar–)Apr–Sep. Sand pine-slash pine, white sand scrub, oak and pine-oak scrub, turkey oak woodland, longleaf pine savanna, pine flatwoods, oak-hickory woods, pine-oak margin, xeric hammocks, low dunes, sandhills and ridges, sandy fields, roadsides, swamp margins, ditches, canal and river banks, river terraces, vacant lots and other disturbed sites; 5–100 m; Ala., D.C., Fla., Ga., Md., N.J., N.C., S.C., Va. Map 8.

Plants of *Galactia brachypoda* are characterized by their essentially procumbent habit with mostly non-twining stems (sometimes weakly twining distally), minutely strigose (antrorse or retrorse) cauline vestiture, subcoriaceous leaflets with raised venation, and relatively large corollas. Plants of *G. brachypoda* with distally twining stems and relatively small leaves might be mistaken for *G. regularis* (which see for comments regarding type-based confusion between the two species), but the latter has climbing and consistently twining stems with looser and non-appressed vestiture, thinner leaves, and longer inflorescences with curved axes and smaller, less congested flowers.

Duncan (1979, p. 174) mapped three morpho-geographic entities of *Galactia brachypoda* (but identifying the species as *G. glabella*) emphasizing stem vestiture — the widespread form has appressed-retrorse hairs, while the other two have appressed-antrorse hairs.

The "retrorse" population system occurs from Florida northward into southeastern Virginia, with an apparent disjunction in Maryland (as mapped by Duncan). The two "antrorse" systems are allopatric:

(a) "Antrorse" plants from Florida and southeastern Georgia are represented by the type of *G. brachypoda*. A collection of antrorse plants has been made from considerably west of the main system: (Alabama. Mobile Co.: Spring Hill, 3 Aug 1897, *Bush 80*, MO, 2 sheets). In Florida, retrorse and antrorse populations are allopatric for the most part, with typical *G. brachypoda* mostly in the western half of the peninsula and distinct in its more mesic, often disturbed habitats (mesic pine flatwoods, oak and pine-oak scrub, sandy fields, swamp margins, ditches, canal banks, river terraces, vacant lots (the type collection of *G. brachypoda*, however, was made from "dry barrens"). In Florida, retrorse populations characteristically occur in sand pine-slash pine, white sand scrub, pine flatwoods, xeric hammocks, roadsides, low dunes, and sandhills.

(b) A northern, primarily "antrorse" system occurs in southeastern North Carolina, South Carolina, and Georgia — these plants characteristically have relatively narrow leaflets and should be studied toward possible formal taxonomic recognition. Stem vestiture in the narrow-leaflet populations includes retrorse forms, perhaps a reflection of gene flow with sympatric populations of different vestiture.

Several collections of broad-leaflet "antrorse" plants have been made near the northern extremity of the retrorse population system (e.g., Anne Arundel Co., Md., *Plitt 67* (MO); Alexandria Co., Va., *Newbold 689* (MO).

Duncan noted (p. 176) that "I have no strong feelings as to how the 'antrorse' population[s] should be treated, as a separate species, as a variety of *G. minor* or *G. glabella*, or otherwise. ... Until further studies can be made, it seems best to include these as forms of *G. glabella*, providing them with no names." Duncan's observations regarding orientation of stem vestiture are essentially confirmed in the present study and like Duncan, I am not able to find any other difference that would consistently distinguish among these population systems and thus here identify all three collectively as *G. brachypoda*. Analogous, alternate orientation of cauline vestiture occurs in *G. joselyniae*, *G. smallii*, *G. microphylla*, and *G. pinetorum*, where there is strong certainty that only a single species is

involved. Still, it seems that a better understanding of how the variation is partitioned in *G. brachypoda* might be possible with field observations and more detailed study.

9. **GALACTIA FLORIDANA** Torrey & Gray, Fl. N. Amer. 1(2): 288. 1838. **TYPE**: **USA. Florida.** [Hillsborough Co.:] Tampa Bay, no other collection data (probable holotype: NY digital image!). The protologue: "Sandy places about Tampa Bay, Florida, *Dr. Burrows*!" A sheet at GH ("ex herb. J. Torrey") is the same species but has slightly different leaf morphology, surely from a different plant, and is unlikely to be a duplicate of the NY sheet -- the GH label has handwritten by A. Gray "Galactia Floridana Chapm. n. sp., Florida."

Galactia brevipes Small, Fl. S.E. U.S., 649, 1332. 1903. **TYPE**: **USA. Georgia.** Charlton Co.: St. Mary's River swamp, below Trader's Hill, 24-26 Jul 1895, *J.K. Small s.n.* (holotype: NY digital image!).

Perennial herbs, from an elongate, narrowly fusiform, woody taproot. **Stems** procumbent, creeping, rooting at nodes, sometimes climbing-sprawling but not twining, up to 4 feet, densely short-tomentose to hirsute-villous with spreading-erect, irregularly oriented hairs. **Leaflets** 3, elliptic to broadly elliptic, thickened-coriaceous, much darker adaxially, (14–)20–55 x (10–)15–35 mm, herbaceous, sparsely persistently strigose-sericeous adaxially with loosely appressed hairs, veins not raised, apices rounded to truncate, commonly shallowly retuse. **Inflorescence** axis 20–100(–130) mm, flowers 5–12(–25) in a pseudoraceme on distal 1/2–1/4 of axis, fasciculate on the raceme. **Calyces** 7–8 mm, villous. **Corollas** 12–15 mm, pink to purple or rose-purple. **Fruits** 30–45 x 3–4(–5) mm, straight, densely villous-hiirsute. **Seeds** 7–11.

Flowering Mar–Aug(–Sep). Open pine woods, pine barrens, longleaf pine-turkey oak-blue oak woods, sandhill scrub, sandhills, roadsides; 10–30 m; Ala., Fla., Ga., La., Miss. Map 9.

Small (1903, 1913, 1933) distinguished *Galactia brevipes* from *G. floridana* by its panicles longer than the leaves and its separated flower clusters (vs. panicles shorter than the leaves or slightly longer and flower clusters approximate). Intermediate forms are common. The species is recognized by its procumbent, densely short-tomentose to hirsute-villous stems, relatively large, thick leaves (compare *G. microphylla*), and large flowers.

Westernmost known localities for *Galactia floridana* are disjunct from the main range, perhaps displaced by storms: **Alabama**. Mobile Co.: Spring Hill, common in woods, 3 Aug 1897, *Bush 304* (MO), 6 Aug 1897, *Bush 302* (MO); Spring Hill, open woods, May 1918, *Graves 1092* (MO); Mobile, Univ. of S. Alabama, open woodlands, 11 Oct 1969, *Rogers 1886* (MO). **Louisiana.** Cameron Par.: Holleyman Bird Sanctuary and I-10 near Sulphur, 5-6 Apr 1986, *McKenzie 264* (LSU digital image!). **Mississippi**. Jackson Co.: Petit Bois Island, stable sand near the coast, 7 Aug 1952 ["8-7-1952"], *Demaree 32599* (ASU).

10. **GALACTIA SMALLII** Rogers ex Herndon, Rhodora 83: 471. 1981 [nom. nov., replacing *G. prostrata* Small]. *Galactia prostrata* Small, Man. S.E. Fl., 719, 1505. 1933 (not *Galactia prostrata* Benth. 1837). **LECTOTYPE** (designated here): **USA. Florida.** Dade Co.: Pinelands, Redland district, 13 May 1918, *J.K. Small 8633* (NY digital image!).

Small cited two types (syntypes) — one for flowers (*Small 8633*, NY) and one for fruits (*Small, Mosier, & Small 6453*, NY). This was repeated by Herndon (1981) in providing the replacement name for the original *G. prostrata* Small. *Small 8633* has both flowers and fruits.

Perennial herbs, from a thick-fusiform, woody taproot. **Stems** procumbent, distally twining, densely to sparsely hirsute-villous to hirsute with slightly deflexed hairs, loosely retrorsely hirsute-villous, or antrorsely hirsute-villous with spreading-ascending hairs. **Leaflets** 3, blades broadly elliptic to broadly elliptic-oblong or suborbicular, 8–25 x 6–20 mm, herbaceous, both sides villous-hirsute with ascending hairs or upper minutely hirsute, veins not raised, apices rounded or usually

shallowly retuse. **Inflorescence** axis (5–)20–60(–90) mm, flowers solitary and axillary or 2–6 in a reduced pseudoraceme at distal 1/4–1/8 of axis. **Calyces** 6–7 mm, strigose to hirsute. **Corollas** 10–15 mm, lavender-pink to purple. **Fruits** 25–50 x 5 mm, straight, densely strigose, surface at least sometime white-glaucous. **Seeds** 7–11.

Flowering Mar–Oct or sporadically all year, abundantly after burns. Pine rockland-slash pine with a shrub canopy of saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), poisonwood (*Metopium toxiferum*), and willow Bustic (*Sideroxylon salicifolium*) over outcropping oolitic limestone; 0–5 m; Fla. (Dade Co.). Map 10.

Specimens examined. **Florida**. Dade Co.: Eureka Drive, just W of Old Cutler Road, burned pineland, prostrate on rock, tardily twining on grasses, 6 Oct 1979, *Avery 2164* (USF); bulldozed pineland at SE corner of Old Cutler Road and US 1, prostrate except for some tips twining, 4 May 1980, *Avery 2229* (NCU, USF); ca. 1 mi W of Homestead, jct SW 192 Ave, SW 344 St., frequent in cleared pineland, 18 Apr 1964, *Burch and Godfrey 312* (TEX); Gossman's, field in pine woods, 25 Feb 1905, *Eaton 1249* (LL); W side of road to Everglades Natl. Park, 0.5 mi S of W. Palm Drive, near Florida City, prostrate, trailing vine at edge of woods, thin soil over limestone, 14 Mar 1982, *Hill 10912* (MO); near US 1 in Homestead, in coral sand and rock, 23 Apr 1949, *Janish 635* (MO); Old Cutler Road, vicinity of Fairchild Tropical Farden, low outcroppings of oolite, pineland with *Serenoa* and *Thrinax*, 1 Jul 1965, *Lakela 28766* (USF); pinelands about Ross Hammock, 23 Jun 1915, *Small, Mosier, and Small 6526* (MO); Seminole Wayside Park, E side of US 1, just S of 296th St., in open areas of pine rockland, 20 Mar 1998, *Woodmansee 30* (USF).

Galactia smallii is endemic to rocky habitats in Dade County and is recognized by its procumbent habit with stems distally twining, stems and leaves variably spreading-hairy to loosely strigose (antrorse or retrorse), and relatively large flowers. The lectotype (*Small 8633*, NY) has spreading cauline vestiture (though strongly glabrescent and not evident on portions of the stems); a photo and line drawing by FNAI (2000) show spreading vestiture. Other collections from the Dade County rocklands essentially identical otherwise in morphology have either spreading hairs or retrorsely or antrorsely oriented hairs, and it appears that all of these plants should be considered as a single population system with variable vestiture. Other species apparently with variable orientation of cauline vestiture are *G. brachypoda*, *G. joselyniae*, and *G. pinetorum*.

The procumbent-sprawling, non-twining habit of *Galactia smallii* and its broadly elliptic to elliptic-oblong leaves are similar to both *G. brachypoda* and *G. floridana*. It is essentially sympatric with *G. brachypoda* at the southernmost extremity of its range but disjunct (a short distance) from *G. floridana*. The cauline vestiture of *G. floridana* is consistently spreading, while that of *G. brachypoda* is tightly appressed, either antrorsely or retrorsely; thus the variable vestiture in *G. smallii* might be considered an amalgum from both of these putative close relatives. *Galactia smallii* differs from *G. floridana* mostly in its stems not rooting at the nodes, smaller leaflets, and fewer flowers.

11. **GALACTIA MICROPHYLLA** (Chapm.) Hall & Ward ex Isely, Brittonia 38: 354. 1986. *Galactia floridana* Torrey & Gray var. *microphylla* Chapm., Fl. South. U.S., 108. 1860. **TYPE: USA. Florida**. No other data, *A.W. Chapman s.n.* (probable holotype: NY 00008130 digital image!).

Galactia mollis var. *microphylla* A. Wood, Amer. Bot. Fl., 98. 1870. Protologue: "Lfts. small (4-6"), oval; fls. solitary, and nearly sessile in the upper axils; pods 5 or 6-seeded. Ga. Fla. (Miss S. Keen.)." **TYPE** not seen; not currently databased among types at NY or GH. The name is only provisionally placed here.

Perennial herbs, from an elongate, often napiform taproot. **Stems** procumbent, not twining, herbaceous to lignescent, hirsute-villous with irregularly to strongly deflexed hairs, rarely nearly appressed-retrorse. **Leaflets** 3, blades elliptic, 10–30 x 5–16 mm, herbaceous, strigose to glabrescent or glabrate adaxially, glossy, glaucous and sparsely short-strigose abaxially with appressed to ascending hairs, veins not raised, apices rounded to obtuse. **Inflorescence** axis 10–20 mm, flowers solitary and axillary or 2–6 in a reduced pseudoraceme. **Calyces** 3–4 mm, closely strigulose. **Corollas** 6–7 mm, light purple. **Fruits** 25–45 x 4–5 mm, straight, short-hirsute with spreading hairs. **Seeds** 3–8.

Flowering Apr–Sep(–Oct). Longleaf pine woodland, scrub, dunes, sandy hills and slopes; 0–10 m; Ala., Fla. Map 4.

Collections examined. **USA. Alabama**. Baldwin Co.: Fort Morgan Peninsula, P.O. Gulf Shores, stable areas, 1 Aug 1954, *Demaree 35909* (USF). Butler Co.: Burnt and bulldozed sands of longleaf pine hills by I-65, S of Georgiana turnoff, 14 Oct 1978, *Kral 63031* (VDB). Covington Co.: Ca. 14 mi S of Opp, sandy longleaf pineland, 5 Oct 1968, *Kral 33666* (VDB); sandy cleared slope above Pigeon River where crossed by Ala 55, SE of McKenzie, 30 Aug 1970, *Kral 40855* (VDB). **Florida**. [Escambia/Santa Rosa/Okaloosa Co.:] Santa Rosa Island, 4 Aug 1941, *Brinker 389* (MO); Santa Rosa Island, 30 Aug 1899, *Tracy 6333* (MO). Escambia Co.: Santa Rosa Island, 2 mi E of Pensacola Beach in dunes along S. Rd. 399, 10 Sep 1977, *Carlton s.n.* (USF). Santa Rosa Co.: 1 mi E of Pensacola Beach on S-399, sand dunes, 9 Sep 1977, *Crewz 1136* (USF). Walton Co.: 5 mi W of Santa Rosa, in deep, white, dune sand, 4 Sep 1954, *Turner and Tharp 3674* (TEX).

Compared to *Galactia floridana*, *G. microphylla* has shorter internodes, smaller and thinner leaves light green on both surfaces and glaucous beneath, shorter inflorescences with fewer flowers, and minutely and closely strigulose calyces.

12. **GALACTIA LONGIFOLIA** (Jacq.) Benth., Ann. Wiener Mus. Naturgesch. 2: 127. 1838. *Galega longifolia* Jacq., Collectanea 2: 349. 1788. *Sweetia longifolia* (Jacq.) DC., Prodr. 2: 381. 1825. *Tephrosia longifolia* (Jacq.) Pers., Syn. Pl. 2(2): 328. 1807. **TYPE: USA.** Not located (W?). Color illustration in Jacq., Icon. Pl. Rarior. 3: 14, t. 572. 1793.

As a synonym of *Galactia longifolia* (Jacq.) Benth., Urban (Symb. Antill. 2: 313. 1900) cited "*Galactia angustifolia Griseb.! Kar. (1857) p. 56* [Syst. Unters. Veg. Kar., 56. 1857] *et Flor. p. 194* [Fl. Brit. W.I., 194. 1864]; *Duss! Flor. Ant. franc. p. 210, — non Kth.*" *Galactia angustifolia* Griseb. has sometimes been listed as a valid name but Grisebach's accounts in 1857 and 1864 both clearly attributed the name to Kunth, thus Urban surely intended the 1900 listing to be interpreted as "in the sense of Grisebach's usage."

Perennial herbs, basal parts not seen. **Stems** climbing-twining, moderately minutely strigose with loosely appressed, retrorse hairs. **Leaflets** 3, blades narrowly oblong to oblong-lanceolate, 25–75 x 6–14 mm, herbaceous, moderately to densely minutely strigulose on both surfaces with closely appressed hairs, veins not raised, apices rounded to obtuse. **Inflorescence** axis 30–120(–280) mm, flowers solitary and axillary or 2–8(–16) in a pseudoraceme on distal 1/4 of axis, sometimes fasciculate on the raceme. **Calyces** 5–6 mm, strigulose. **Corollas** 10–11 mm, lavender. **Fruits** 35–65 x 4–6 mm, straight, sparsely minutely strigulose with closely appressed hairs. **Seeds** 12–15.

Flowering Apr–Aug(–Sep). Coastal prairie, clay, poorly drained sandy loam; 10–30 m; Tex.; South America (fide Burkart 1971: Argentina, French Guiana, Paraguay), West Indies (Hispaniola, Puerto Rico, Lesser Antilles [fide Wiersema et al. 1990: Barbados, Grenada, Guadeloupe, Martinique, St. Christopher, St. Lucia, St. Vincent]). Map 16.

In Texas, as identified here, *Galactia longifolia* is known from a cluster of five coastal counties (Aransas, Brazoria, Calhoun, Jackson, Victoria). The irregularly scattered distribution of this species (southern South America, French Guiana, Caribbean, Texas, Florida) suggests that it is not monophyletic.

13. **GALACTIA REGULARIS** (L.) Britton, Sterns, & Poggenb., Prelim. Cat. New York, 14. 1888. *Dolichos regularis* L., Sp. Pl. 2: 726. 1753. **LECTOTYPE** (Duncan 1979, p. 173, fide Jarvis 2007): **USA. Virginia**. Protologue: "Habitat in Virginia." *J. Clayton 121* (BM 38167 digital image!, Figure 3). Duncan's discussion in 1979 clearly was in reference to the morphology of *Clayton 121* but he identified the specimen only as "Virginia — Clayton — ex Herb. Gronovii in BM," without a specific indication of which Clayton collection; *Clayton 213* (BM) is the species identified here as *Galactia brachypoda*.

In any case, the specimen associated by Linnaeus with his *Galactia regularis* is unequivocally clear. He cited "8. DOLICHOS foliis ovatis obtusis, pedunculis multifloris, petalis aequalis magnitudinis figuraeque, Gron. [as 'Gorn.'] virg. 82. Habitat in Virginia." The species identified by this phrase in Gronovius (ed. 1, p. 82-83) explicitly cites *Clayton 121* at the end of the description; the immediately preceding species (p. 82) cites *Clayton 213*. *Clayton 213* is the procumbent-stemmed, large-flowered species identified here as *G. brachypoda*. *Galactia regularis* and *G. volubilis* refer to the same species (recognized here as *G. regularis*, in agreement with Duncan 1979).

Ervum volubile Walt., Fl. Carol., 187. 1788. **TYPE: USA**. Not specified; apparently not included among names dealt with in the Thomas Walter Typification Project by Ward in 2006-2008. Protologue: "caule volubili, pedunculis multifloris, floribus geminatis incarnatis vexillo subtus glauco, foliis ternatis ovatis utrinque emarginatis." Placement of this name as a synonym by various authors apparently has been only speculative, since the protologue does not give enough information for an unambiguous identification. With twining stems and ovate, emarginate leaflets and the probable South Carolina locality, and with the certainty that it is not *Ervum erectum* (= *Galactia erecta*), the only other species of *Ervum* included by Walter, it seems possible that he was referring to *Hedysarum volubile* of Linnaeus, perhaps intending his name as a new combination in *Ervum*. De Candolle (Prodr. 2: 238. 1825) included *Ervum volubile* Walt. as a synonym of *G. glabella* Michx. but presumably based solely on Walter's description.

Galactia villosa Nutt. ex Eaton & Wright, Man. Bot. (ed. 8) 248. 1840 [nom. illeg., not *G. villosa* Wight & Arn. 1834]. Eaton and Wright listed this name as "villosa, N" — the "N" obviously signifying Nuttall as it did also in *G. elliottii* and *G. pilosa* of their account. For *G. villosa*, they cited neither geographic range nor collection data and the minimal description hardly eliminates any species.

Galactia volubilis (L.) Britt. var. *mississippiensis* Vail, Bull. Torrey Bot. Club 22: 508. 1895. *Galactia mississippiensis* (Vail) Rydb., Fl. Plains N. Amer. 493. 1932. **TYPE: USA**. Protologue: "Missouri, Arkansas, Indian Territory, and Louisiana. An oval, pilose-leaved form that in Missouri seems very distinct, but specimens from other localities seem to intergrade with the broader leaved form of the type." No type cited, not located (NY?).

Perennial herbs, from an elongate woody taproot. **Stems** climbing-twining, herbaceous, moderately to densely hirsute to hirsute-villous with spreading-deflexed hairs. **Leaflets** 3, blades elliptic to broadly elliptic, oblong-elliptic, or lanceolate-elliptic, (10–)14–40(–50) x (5–)10–21(–25) mm, herbaceous, sparsely strigose abaxially and often glaucous, minutely and sparsely short-strigose adaxially, veins not raised, apices obtuse to rounded or shallowly retuse. **Inflorescence** axis 10–70(–150) mm, flowers solitary and axillary or 2–7(–9) in a reduced pseudoraceme on the distal 1/2–3/4 of the axis, often fasciculate on the raceme. **Calyces** 4–6 mm, hirsute-villous. **Corollas** 7–10 mm, pink to rose, light violet, pink-purple, rose-purple. **Fruits** 20–50 x 3–5 mm, straight, vestiture. **Seeds** 5–9.

Flowering (Jun–)Jul–Aug. Oak and pine-oak woods, woodland borders, fence rows, low fields, pond and stream margins, ditches, roadbanks, open disturbed sites; 20–500(–900) m; Ala., Ark., Del., Fla., Ga., Ill., Ind., Kan., Ky., La., Md., Miss., Mo., N.J., N.Y., N.C., Ohio, Okl., Penn., S.C., Tenn., Tex., Va., W.Va. Map 11.

Several collections of *Galactia regularis* have been made in Texas at localities long-disjunct from the main range. **Texas**. Brewster Co.: Glass Mts, scattered on Iron Mt., 20 Aug 1940, Warnock W76 (SMU, TEX). Cameron Co.: 1/2 mi SW of Olmito, 2 Dec 1945, *Cory 51457* (SMU); occasional near the coast and at Rabb Palm Grove and Brownsville, 28 Jul 1965, *Runyon 5909* (SRSC).

Application of the names *Galactia volubilis*, *G. regularis*, *G. macreei*, and *G. glabella* has been controversial and inconsistent but typifications outlined in the present study strongly constrain the taxonomy. Duncan's assessment (1979) of the two twining species was mostly correct. *Galactia regularis* refers to the species widespread in the eastern USA, with leaflets mostly elliptic to broadly elliptic, relatively small flowers, and twining stems hirsute-villous with deflexed hairs. *Galactia volubilis* (with *G. glabella* and *G. macreei* as synonyms) is the species with characteristically narrowly oblong leaflets, slightly larger flowers, and twining, sparsely antrorsely strigose to glabrate stems (see Figs. 7a, b, and c for leaflet variability in *G. regularis* and *G. volubilis*) — it is distributed mostly on the coastal plain from North Carolina to Georgia and Floirda, then westward to Arkansas, Louisiana, and Texas. *Galactia brachypoda* (= *G. glabella* sensu Duncan 1979) is the species with relatively larger flowers and procumbent, short-strigose stems — it is a coastal plain species from Maryland and Virginia to Alabama.

Usage of the names

Since the two Linnaean names were brought into use in *Galactia* (*G. regularis* in 1888, *G. volubilis* 1894), use of *G. volubilis* has been used in most instances to identify the species of twining plants with small flowers and deflexed-hirsute-villous stems. In making the combination for *G. regularis*, Britton et al. placed *G. glabella* (apparently in the sense of *G. brachypoda* here) in its synonymy; six years later he brought in *G. volubilis* (in the sense of *G. regularis* here).

Confusion between *Galactia glabella* and *G. regularis* began at least as early as 1825, when de Candolle (Prodr. 2: 238) placed *Dolichos regularis* L. 1753 as a synonym of *G. glabella* Michx. 1803, noting that two species were perhaps confused in circumscription. Torrey and Gray (1838) did not include *D. regularis* or *Hedysarum volubilis* even as syononyms, but *G. regularis* has included *G. glabella* as a synonym in continuing general usage (e.g., Britton et al. 1888; Britton & Brown 1897; Mohr 1901, Small 1903, 1913, 1933; Fernald 1950; Gleason & Cronquist 1991; Isely 1998).

Duncan (1979) recognized that the types of *Galactia regularis* and *G. glabella* were different species. *Galactia regularis* is the name of the species identified for nearly 100 years as *G. volubilis*, while *G. glabella* refers to the narrower-leaflet, larger-flowered, twining plants but is a synonym of *G. volubilis*. Usage of the name *G. volubilis* took a sudden turn when Duncan (as followed here) concluded that it applied to the narrower-leaflet species (here including *G. macreei* and *G. glabella*).

Galactia macreei commonly has been treated as a synonym of either *G. volubilis* or *G. regularis* (Vail 1895; Duncan 1979; Isely 1998; Wunderlin & Hansen 2011; Ward & Hall 2004; Weakley 2012; Weakley et al. 2012). Remarkably, Small (1933) did not include it even as a synonym. For Texas, Turner (1959, 1971) and Turner et al. (2003) recognized *G. macreei* but his concept apparently included scattered variants of *G. volubilis*. Duncan (1979) treated *G. macreei* as a distinct species (synonymous with *G. volubilis*). The narrower-leaflet species is recognized here (as *G. volubilis*) as distinct, in agreement with Fernald (1950), Wilbur (1963, 1968), Long and Lakela (1971), and Gleason and Cronquist (1991).

Figure 3. Lectotype of *Dolichos regularis* L.

Figure 4. Lectotype (Reveal & Jarvis 2009) of *Hedysarum volubile* L. Plate 143, in Dillenius, Hort. Eltham. 1: 173, t. 143, fig. 170. 1732. Leaflet shape of the illustrated plants is unequivocally that of *Galactia volubilis* as treated here (see Figs. 7a, b, c), but the stem vestiture is more like that of *G. regularis*.

Figure 5. The OXF specimen putatively associated with the Dillenius illustration (from color images sent by OXF Curator Stephen Harris). Clearly identified as to *G. volubilis* in the sense here.

14. **GALACTIA VOLUBILIS** (L.) Britt., Mem. Torrey Bot. Club 5: 208. 1894. *Hedysarum volubile* L., Sp. Pl. 2: 750. 1753. **LECTOTYPE** (Reveal & Jarvis 2009): **USA.** [Virginia? or more likely further south, where the species is more common): No other data. Plate 143 of Dillenius, Hort. Eltham. 1: 173, t. 143, fig. 170. 1732. Here as Figure 4.

As noted by Jarvis (2007): "Torrey and Gray stated [1840, p. 365] that the name was 'founded upon' Dillenius [Hort. Eltham., plate 143, 1732], but this is not accepted as equivalent to the use of 'type'" (thus did not effect a lectotypification).

Protologue: "26. HEDYSARUM foliis ternatis ovato-oblongis, caule volubili. *Hort. cliff.* 499. *Roy. lugdb.* 385. Hedysarum trifolium scandens, folio longiore splendente. *Dill. elth.* 173, t. 143. f. 170. Habitat in America septentrionalis."

The Hortus Cliffortianus entry: "6. HEDYSARUM foliis ternatis, ovato-oblongis, caule volubili. Hedysarum trifolium scandens, folio longiore splendente. *Dill. elth.* 173, t. 143. f. 170. Crescit in America septentrionali."

The original and complete description, including reference to the Dillenius plate, was published in Hortus Cliffortianus of 1737 (above). Van Royen's Florae Leydensis of 1740 ("Roy. lugdb.") repeated the Hortus Cliffortianus entry and cited it. The Species Plantarum entry of 1753 again repeated the description and cited both earlier publications.

Duncan (1979) observed that a specimen in the Dillenius herbarium (OXF) is part of the original material of *Hedysarum volubile* (putatively associated with the Hortus Elthamensis illustration). Duncan concluded that the illustration is ambiguously identified but that the OXF specimen is the same species as typified by *Galactia macreei*. The original label of the OXF specimen (Figure 5; "1534," without collector or locality; from observations and color images sent to me by OXF Curator Stephen Harris) has the original phrase associated with *Hedysarum volubile* but it is dated "1748," postdating the publication of Hortus Elthamensis — thus the specimen apparently did not underlie the illustration and the lectotypification is correctly based only on the illustration.

In the interpretation here, however, the Dillenius illustration and OXF specimen represent the same species. The identity of the specimen is unequivocal — it has stems with closely retrorsely appressed stem vestiture of short hairs (fide Stephen Harris), narrowly elliptic-lanceolate leaflets with glaucous lower surfaces, long inflorescences, and relatively large flowers. The illustration shows a plant with twining stems, leaflets of characteristic shape (like the illustration), and larger flowers; stem vestiture is portrayed as more similar to *G. regularis* — this might reflect genetic influence from *G. regularis* or it could have been simply a slight exaggeration by the artist to show the orientation of the hairs.

Galactia glabella Michx., Fl. Bor. Amer. 2: 62. 1803. **TYPE: USA. South Carolina.** Colleton Co.: Protologue: "Hab. in Carolina and Georgia." Label: "Col. Co. S. Carolina" (holotype: P-Michaux, microfiche image!, Figure 6). Duncan (1979, p. 175) noted that in Michaux's time, Colleton County included all of Charleston County southwest of the Ashley River.

The filiform, tightly twining stems, the narrowly oblong-ovate leaflets, the description by Michaux of the glabrous calyx ("calycibus glabris") and the plant as generally glabrous ("GLABELLA. G. glabriuscula"), and the geographic location provide barely controvertible evidence for associating the Michaux type with the species generally identified as *Galactia macreei*. Duncan used the name *G. glabella* for the procumbent species (identified here as *G. brachypoda*), explicitly choosing to regard the twining feature clearly evident in the type as a "possible discrepancy."

A fragmentary specimen in the general collection at P (cat. P00798727 digital image!, labeled as "Isotype") is not the same species as that in the Michaux herbarium — instead it apparently is the procumbent species identified here as *G. brachypoda* (nothwithstanding an annotation by W.H. Duncan in 1977 as "*Galactia regularis* (L.) BSP. non sensu recent American authors."

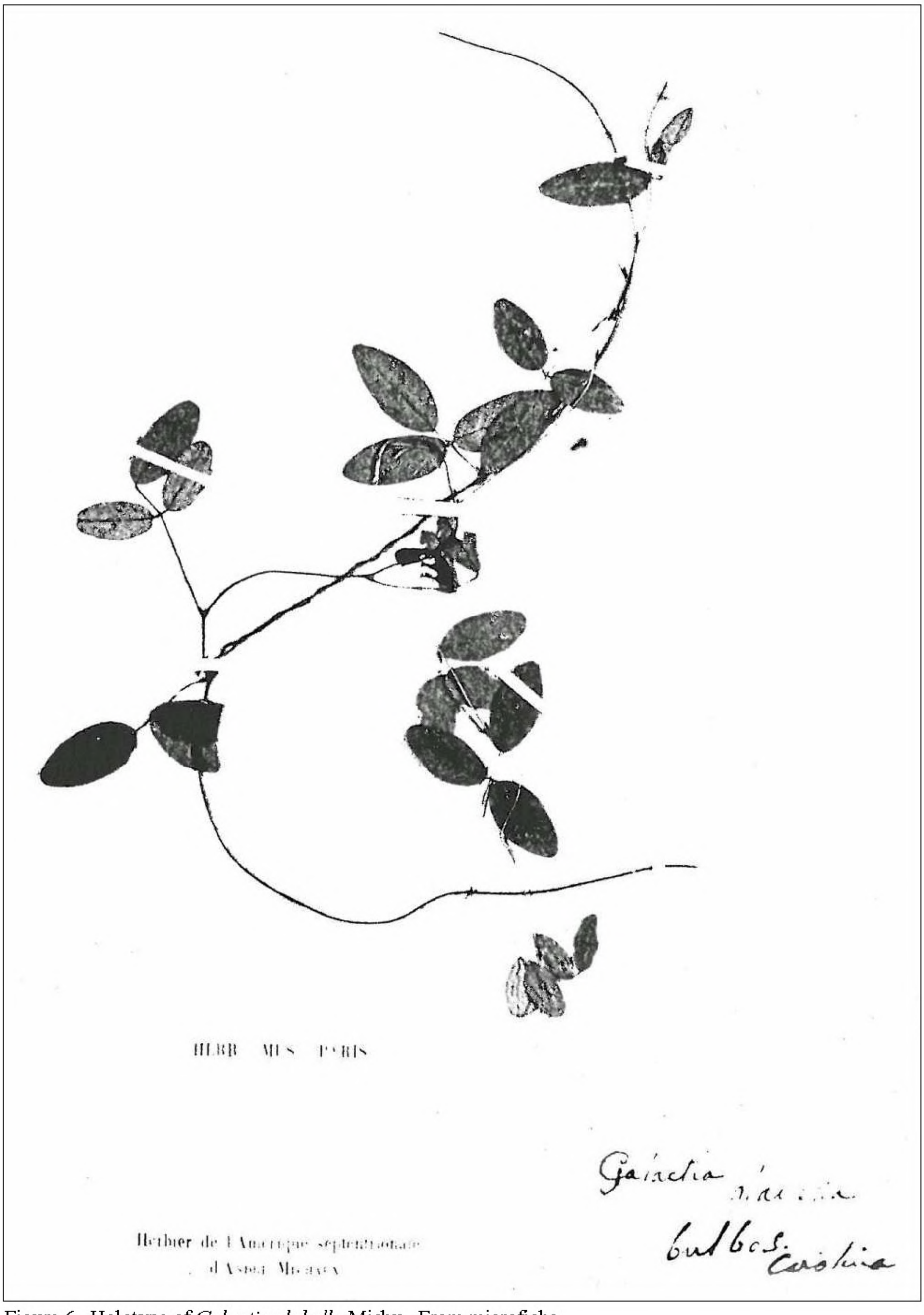

Figure 6. Holotype of *Galactia glabella* Michx. From microfiche.

Galactia macreei M.A. Curtis, Boston J. Nat. Hist. 1: 120. 1837. *Galactia pilosa* var. *macreei* (M.A. Curtis) Torrey & Gray, Fl. N. Amer. 1(2): 287. 1838. **TYPE: USA. North Carolina.** No type cited, but the original publication (Curtis 1837) is an enumeration of plants collected from around Wilmington, North Carolina. Probable holotype: North Carolina, no other data, *M.A. Curtis s.n.* (GH 00002425 digital image!). Torrey and Gray (1838), in making the combination at varietal rank, indicated that they saw a collection by Curtis, presumably GH 00002425.

A specimen at MO (216253/18547/2331175 digital image!) was collected in North Carolina (1847, *M.A. Curtis s.n.*) but is not type material because of the collection date. WIS 0255378 (digital image!) was collected in Louisiana apparently by *M.A. Curtis* (without a collection number or date) — it is *G. volubilis* but is not type material.

Galactia pilosa Nutt. var. *angustifolia* Torrey & Gray, Fl. N. Amer. 1(2): 287. 1838. **TYPE: USA. Florida.** Protologue: "Middle Florida, Croom! East Florida, Lieut. Alden!" Not seen. The name is provisionally placed in synonymy here.

Galactia volubilis (L.) Britt. var. *intermedia* Vail, Bull. Torrey Bot. Club 22: 508. 1895 [nom. illeg.]. **TYPE: USA.** "Florida to Louisiana." In synonymy of var. *intermedia*, Vail cited "*Galactia pilosa* γ *angustifolia* Torrey & Gray [1838]. Not *G. angustifolia* Kunth."

Perennial herbs, from a woody taproot. **Stems** climbing-twining, herbaceous, sparsely to moderately strigose with tightly to loosely appressed, retrorse hairs, sometimes glabrate. **Leaflets** 3, blades oblong to narrowly elliptic or narrowly lanceolate-elliptic, (10–)12–40(–45) x 5–15(–17) mm, herbaceous, glabrous to sparsely strigose adaxially, short-strigose abaxially, veins not raised, apices rounded to truncate or shallowly retuse. **Inflorescence** axis (10–)20–90(–240) mm, flowers solitary and axillary or 2–6(–10) in a reduced pseudoraceme on the distal 1/3–3/4 of the axis, sometimes fasciculate on the raceme. **Calyces** 6–8 mm, sparsely strigose to glabrate. **Corollas** 9–14 mm, pink to pink and purple. **Fruits** (20–)25–52 x 3–4 mm, straight, short-strigose. **Seeds** (5–)7–11.

Flowering (Apr–)May–Aug(–Sep). Swamp forest and borders, brackish marsh, ditches, shell mounds, hammock edges, live oak woods, pine and oak-pine woods, roadsides, cutover woods and other disturbed sites; 20–600 m. Ala., Fla., Ga., La., Miss., N.C., S.C., Tex. Map 12.

The distinction between *Galactia volubilis* and *G. regularis* is subtle but examination of hundreds of collections provides a basis for considering them separate entities. The two appear to be mostly distinct in their area of sympatry (*G. regularis* has a much wider geographic range), but intermediates are encountered. Flowering times coincide and there is overlap in habitat, allowing opportunities for hybridization, but the relative stability of the two forms suggests that some kind of reproductive isolation is in effect, perhaps post-zygotic.

The most prominent distinction between the two species is in leaflet shape, which usually provides evidence for a reasonable 'first sort' to species. Figures 7a, b, and c show a range of variation within each species, summarized in key couplet 20. Additionally, the leaves of *Galactia volubilis* tend to be thinner and glaucous on the abaxial surface.

Two collections from the same locality in Collier Co., Florida, have particularly large leaves but seem best identified as *Galactia volubilis*. Collier Co.: Fakahatchee Strand Preserve State Park, Gate 12, East Main Tram, strand swamp/logging tram, 23 Aug 2000, *Owen FS0210* (USF! and see digital image); Fakahatchee Strand Preserve SP, Gate 12, near entrance, strand swamp/logging tram, 25 Sep 1999, *Hattaway FS0211* (USF! and see digital image).

Figure 7a. Leaf variation in *Galactia regularis*. All examples from Alabama.

Figure 7b. Leaf variation in *Galactia volubilis*. All examples from Florida.

Figure 7c. Leaf variation in *Galactia volubilis*. All examples from Alabama.

15. **GALACTIA ERECTA** (Walt.) Vail, Bull. Torrey Bot. Club 22: 502. 1895. *Ervum erectum* Walt., Fl. Carol., 187. 1788. **NEOTYPE** (Ward 2008, p. 476): **USA. South Carolina**. Georgetown Co.: 5 mi S of Andrews, 10 Sep 1939, *R.K. Godfrey 147* (GH; isoneotypes: BH, DUKE, F, MO, NY, US).

Glycine stricta Hook., Comp. Bot. Mag. 1: 22. 1835. **TYPE**: **USA. Louisiana**. [St. Tammany Par.:] "Covington," 1831-32, *T. Drummond s.n.* (holotype: K?).

Galactia sessiliflora Torrey & Gray, Fl. N. Amer. 1(2): 288. 1838. **LECTOTYPE** (designated here): **USA. Florida**. Protologue: "Middle Florida, Dr. Chapman!" Florida, no other data, *A.W. Chapman s.n.* (GH 229576 digital image!; isolectotypes: GH digital image!, NY 2 sheets digital images). Also cited in the protologue was "Alabama, Dr. Gates!"

Perennial herbs, from a slender, irregularly thickened to neary moniliform taproot, also commonly producing very slender rhizomes. **Stems** mostly erect, not twining, usually alternately bent at nodes, (10–)20–30(–40) cm, herbaceous, glabrous or glabrate to sparsely strigose with closely appressed, retrorse hairs. **Leaflets** 3, blades oblong or narrowly oblong to narrowly elliptic or oblong-lanceolate, (15–)25–40(–50) x 7–18 mm, coriaceous, glabrous on both surfaces, venation closely reticulate (areoles isodiametric) and raised on both surfaces, with a thickened, continuous, marginal vein, apices rounded to obtuse, sometimes retuse. **Inflorescence** of axillary, subsessile fascicles, flowers solitary and axillary or 2–6 in a reduced pseudoraceme. **Calyces** 5–6 mm, short-strigose. **Corollas** 7–8 mm, pale purple to white (consistently white in Texas). **Fruits** 20–40 x 5–8 mm, densely hirsute. **Seeds** 6–10.

Flowering Apr–Jul. Longleaf pine, longleaf pine-oak scrub, oak scrub, wiregrass-slashpine woodland, pine flatwoods; 10–150 m; Ala., Fla., Ga., La., Miss., N.C., S.C., Tex. Map 13.

Galactia erecta is distinct in its erect habit, slender rhizomes, subsessile leaflets, and flowers in axillary-sessile clusters.

16. **GALACTIA JOSELYNIAE** Nesom, **sp. nov. TYPE**: **USA. Texas**. Brewster Co.: Big Bend National Park, Dead Horse Mountains, Passionflower Canyon, in wash bottom, 2 Aug 2003, *J. Fenstermacher 188* (holotype: SRSC). (Figures 8, 9, 10, 11, 12).

Similar to *Galactia wrightii* A. Gray in its mostly trailing stems and densely hairy leaves but different cauline vestiture with hairs either antrorsely or retrorsely oriented, leaflets smaller, broadly oblong to suborbicular with both surfaces gray-glaucous beneath the vestiture, and flowers smaller and fewer.

Perennial herbs from a woody taproot. **Stems** procumbent, perhaps weakly twining distally, herbaceous or lignescent proximally, loosely strigose with hairs antrorsely oriented (Brewster Co.) or retrorsely oriented (Jeff Davis Co.; Coahuila). **Leaflets** 3 (very rarely 5 on *Warnock 7917*), blades mostly broadly oblong-elliptic to suborbicular, also broadly oblong to broadly oblong-oblanceolate, (9–)11–29(–37) x 6–24(–34) mm, herbaceous, light green to glaucous (beneath the vestiture), densely hirsute-strigose to loosely strigose-sericeous on both surfaces, sometimes more densely so along the abaxial veins, veins strongly raised on abaxial surface but not adaxially, apices rounded to truncate or retuse. **Inflorescence** axis (1–)4–13(–15) cm, flowers solitary and axillary or 2–8 in a pseudoraceme, not fasciculate. **Calyces** 4–5 mm, loosely strigose. **Corollas** 6–8 mm, pink to rose-pink, drying dull blue-purple. **Fruits** 25–40 x 4–6 mm, straight, sparsely strigose with minutely filiform hairs. **Seeds** (4–)5–6.

Flowering Jun or perhaps much earlier–Aug. Gravelly canyon washes, from rock cracks and under shrubs (e.g., *Agave*, *Diospyros*, *Fallugia*, *Porophyllum*, *Viguiera*, *Yucca*); 600–1450 m; trans-Pecos Texas (Brewster and Jeff Davis cos.) and Coahuila, Mexico. Map 16.

Figure 8. Holotype of *Galactia joselyniae*.

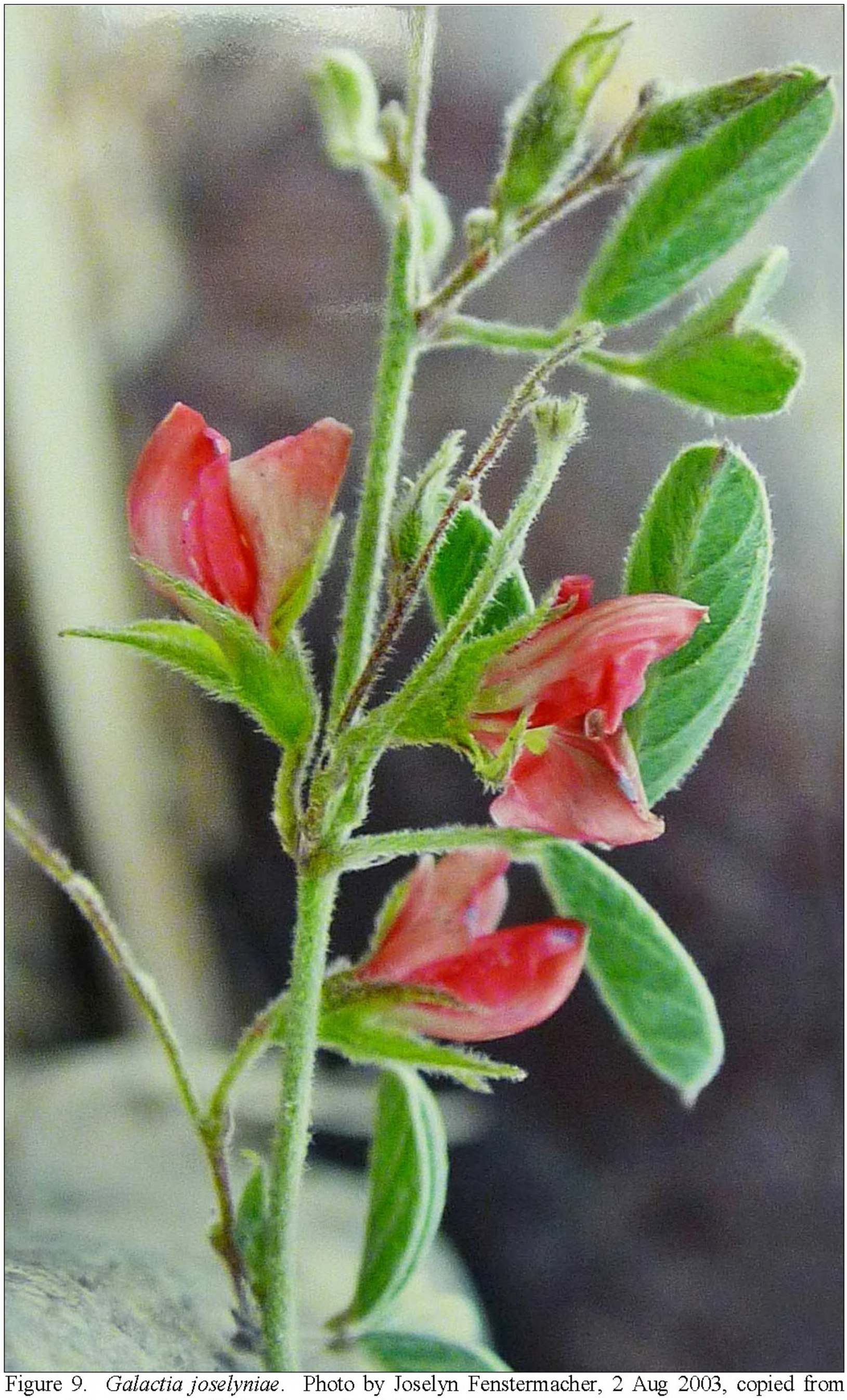

Figure 9. *Galactia joselyniae*. Photo by Joselyn Fenstermacher, 2 Aug 2003, copied from color photo mounted with *Fenstermacher 961*.

Figure 10. *Galactia joselyniae*. Coahuila, Mexico, *Villarreal 3302* (ARIZ).

Figure 11. *Galactia joselyniae*. Brewster Co., Texas, *Fenstermacher 1060* (SRSC).

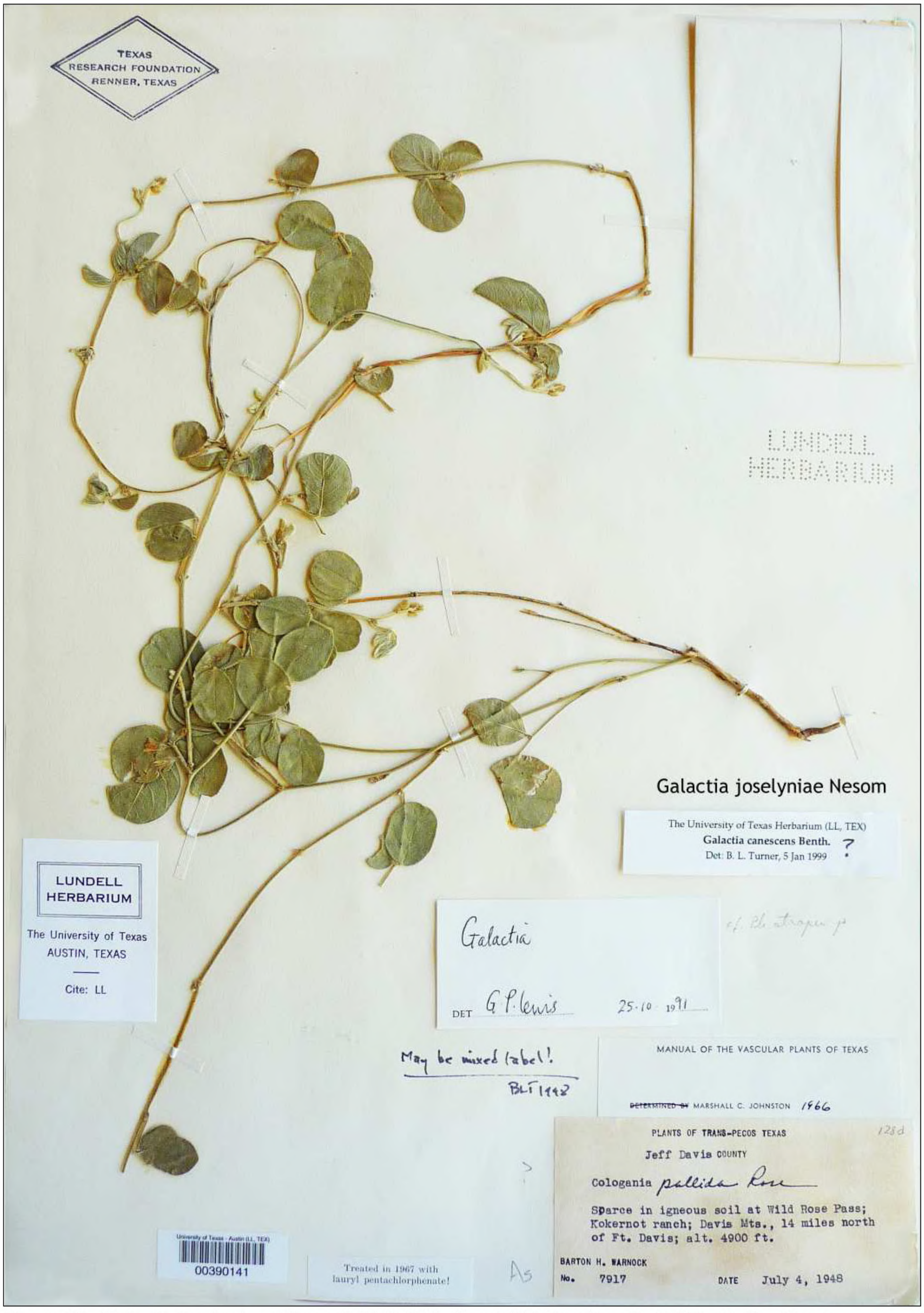

Figure 12. *Galactia joselyniae*. *Warnock 7917* (LL), from Wild Rose Pass in Jeff Davis Co., Texas.

Additional collections examined. **MEXICO. Coahuila**. Sierra de Menchaca, 6 km N carr. Cuatrocienegas-Sacramento (30), matorral de *Acacia*, *Leucophyllum*, *Cercidium*, *Fouquieria*, y *Yucca*, 7 Jun 1986, *Villarreal 3302 et al.* (ARIZ). **USA. Texas**. Brewster Co.: Big Bend National Park, Dead Horse Mountains: Passionflower Canyon, in western half of wash ca. 200 ft below constriction, just where *Bouchea spauthulata* first occurs mid-wash, bottom of wide, open, gravel wash, under clump of *Yucca torreyana*, *Parthenium incanum*, and *Fallugia paradoxa*, 2750 ft, 5 Aug 2005, *Fenstermacher 940* (SRSC); Passionflower Canyon, S end, below first constriction but still within canyon, E side of wash, a little higher that main channel, only occasionally flooded, with *Viguiera stenoloba*, *Porophyllum scoparium*, *Agave lechuguilla*, 5 Aug 2005, *Fenstermacher 961* (SRSC); Boquillas Canyon, just inside mouth of Arroyo Venado, under and within small shrubs, growing out of crack in rock, 1850 ft, 13 Aug 2005, *Fenstermacher 1060* (SRSC); Boquillas Canyon, within first half mile of Cow Canyon, in wash gravel, 1800 ft, 28 Oct 2005, *Fenstermacher 2141* (SRSC); Boquillas Canyon, within first half mile of Arroyo Venado, with *Diospyros*, *Croton*, *Acalypha*, 1800 ft, 27 Oct 2005, *Fenstermacher 2090* (SRSC). Jeff Davis Co.: Davis Mts., Wild Rose Pass, Kokernot Ranch, 14 mi N of Ft. Davis, sparse in igneous soil, 4900 ft, 4 Jul 1948, *B.H. Warnock 7917* (LL, SMU, SRSC).

The epithet commemorates Joselyn Fenstermacher, who made the Brewster County collections in her study (as a student at Sul Ross State University) of the flora of the Dead Horse Mountains (Fenstermacher et al. 2008). She is still exploring the landscape (Fenstermacher 2015). Earlier collections apparently of the same species were made by Jose Villarreal in central Coahuila and by Barton Warnock further north in Jeff Davis Co., Texas, but the nature and reality of the species would not have been possible to appreciate without the Fenstermacher collections. Fenstermacher et al. (2008, p. 701) noted that the Dead Horse plants were perhaps an undescribed species: "It does not fit descriptions of known Texan taxa (B. Turner pers. comm.) and awaits review when appropriate herbarium specimens become available."

The Warnock collection from Wild Rose Pass (along Hwy 17 in Jeff Davis County) was identified in 1955 by B.L. Turner as "Galactia warnockii Turner" sp. nov. and then in 1994 by J. Henrickson as "Galactia warnockii Turner ex Henrickson" sp. nov. — but perhaps neither at the time felt comfortable in formally describing a new species based on a single collection from a well-explored and collected area. The leaflets are broader than those from the region of the type collection and from Coahuila, but other features are those of *G. joselyniae*.

The Dead Horse Mountains are parallel to the western boundary of Big Bend National Park, immediately adjacent to northwestern Coahuila (see Fenstermacher et al. 2008). "Populations have been found in several southern [Dead Horse] locations and the plant was encountered more commonly near the Rio Grande within side drainages of Boquillas Canyon" (Fenstermacher et al. 2008, p. 701). The Mexican collection was made in central Coahuila, about 300 kilometers south of the Brewster County sites — the occurrence of *Galactia joselyniae* in the area between should be expected.

17. **GALACTIA WRIGHTII** A. Gray, Smithsonian Contr. Knowl. [Pl. Wright. 1] 3(5): 44. 1852. *Odonia wrightii* (A. Gray) Rose, Contr. U.S. Natl. Herb. 10: 102. 1906. **TYPE: USA. Texas.** [Jeff Davis Co.:] Outside of Fort Davis, valley of the Limpia, 23 Aug 1849, *C. Wright 111* (holotype: GH digital image!; isotype: NY digital image!).

Galactia tephrodes A. Gray, Smithson. Contr. Knowl. [Pl. Wright.] 5(6): 34. 1853. **TYPE: USA. New Mexico**. [Hidalgo Co.:] Protologue: "Mountain-sides, near Conde's Camp, between the copper mines and Chiricahui Mountains, New Mexico, Aug.," [ca. 31 Aug] 1851, *C. Wright 956* (holotype: GH digital image!; isotypes: GH digital image!, NY digital image!, PH digital image!, US digital image!). All are labeled as "Wright 956," but only the NY sheet has locality data matching the protologue. The PH label says only "Coppermines;" labels for the

other sheets, including the holotype, have no locality indicated. Conde's Camp was about 20 miles west or southwest of Lordsburg in Hidalgo County, near the Arizona border (as inferred from Wooton 1906).

Galactia wrightii var. *mollissima* Kearney & Peebles, J. Wash. Acad. Sci. 29: 485. 1939. **TYPE**: **USA**. **Arizona**. Santa Cruz Co.: Near Patagonia, 7 Aug 1927, *R.H. Peebles, G.J. Harrison, & T.H. Kearney 4657* (holotype: US digital image!).

Perennial herbs, arising from an woody taproot. **Stems** first procumbent, then weakly twining distally, strongly lignescent, densely to sparsely strigose with retrorsely appressed to slightly spreading hairs. **Leaflets** 3, blades oblong-elliptic to elliptic-ovate, 15–48 x 5–18 mm, herbaceous, adaxially sparsely to densely short strigose-sericeous with closely appressed hairs to pubescent with soft, spreading-erect hairs, moderately to densely strigose-sericeous and glaucous abaxially, sometimes sparsely strigose to glabrous adaxially, veins not raised, apices rounded to obtuse or shallowly retuse. **Inflorescence** axis 35–200(–250) mm, flowers (2–)5–18(–30) in a pseudoraceme, commonly fasciculate on the raceme, axis rarely 10 mm and 2–3 flowered. **Calyces** 5–7 mm, loosely short-strigose to hirsute-pubescent. **Corollas** 11–12 mm, pink to purple-rose to lavender. **Fruits** 25–50 x 4–5 mm, straight, moderately to densely strigose to strigose-sericeous. **Seeds** (3–)5–9.

Flowering May–Aug. Grassland, desert scrub, oak-juniper and oak woodland, granite crevices, igneous talus, among boulders, gravelly alluvium; 800–2100 m; Ariz., N.Mex., Tex.; Mexico (Chihuahua, Sonora). Map 14.

Galactia wrightii is characterized by twining stems, mostly oblong-elliptic leaflets with glaucous abaxial surfaces, long inflorescences with numerous flowers and relatively large corollas, and strigose-sericeous fruits. The type of var. *mollissima* is a plant with vestiture more spreading than normal — such variants are scattered through the range in Arizona, as cited by Kearney and Peebles, as well as in Texas.

Plants in southwestern New Mexico and southeastern Arizona (especially the Huachuca Mountains but not the Chiricahua Mts) tend to have reduced vestiture — the leaves sometimes completely glabrous. Such plants extend southward in Mexico along the Chihuahua-Sonora border region. Intermediates are numerous, however, especially in Arizona, and no distinct boundary seems evident.

18. **GALACTIA CANESCENS** Benth., Ann. Wiener Mus. Naturgesch. 2: 126. 1838. **LECTOTYPE** (designated here): **USA**. **Texas**. Protologue: "Texas. Drummond." Without other data, *T. Drummond 146* (holotype: W digital image!; isotypes: GH-2 sheets digital images!, US ex herb. Lausanne digital image!). One of the GH sheets has no collection number.

Heterocarpaea texana Scheele, Linnaea 21: 468. 1848. **TYPE**: **USA**. **Texas**. [Comal Co.:] Protologue: "Auf Felsboden südlich von Neubraunfels [On rocky ground south of New Braunfels]: Lindheimer. Juli." Field label (GH): "On rocky soil, part of the fruits subterraneous, stem prostrate, radiant, N. Br. [New Braunfels], Texas, July 46, F.L. 266." Printed label: Jul 1846. F. Lindheimer Fasc. III, 370 (holotype: CAS?; isotypes: GH digital image!, NY digital image!, P-4 sheets digital images!, PH 3 sheets digital images!, SI [ex P] digital image!, US digital image!).

Perennial herbs, from slender, elongate woody taproot, commonly producing filiform rhizomes at the nodes, these producing 1-seeded subterranean flowers and fruits. **Stems** procumbent, not twining, lignescent proximally, moderately strigose with loosely appressed, retrorse hairs. **Leaflets** 3, blades broadly oblong to oblong-obovate, olong-elliptic, or suborbicular, 11–35(–42) x 8–30(–35) mm, herbaceous, blue-green-glaucous and densely strigose abaxially, sparsely strigose adaxially with closely appressed hairs, veins not raised, apices rounded to flat or shallowly retuse.

Inflorescence axis 60–120 mm, flowers 5–8 in a pseudoraceme. **Calyces** 5–8 mm, hirsute to strigose-hirsute. **Corollas** 9–11 mm, pink to pink-red or light purple. **Fruits** 30–50 x 6–9 mm, straight or slightly curved, densely strigose-sericeous. **Seeds** 1–5.

Flowering Apr–Oct. Sandy prairies, dunes, sand mounds, sandy roadsides, disturbed sites, sandy loam, alluvial sand; 10–150 m; Tex.; Mexico (Tamaulipas). Map 15; Mexican distribution now shown.

Galactia canescens is characterized by its procumbent, strigose stems rooting at the nodes, slender rhizomes often bearing subterranean flowers and fruits, and broadly oblong to suborbicular leaflets with glaucous and densely strigose abaxial surfaces. The subterranean, cleistogamous flowers apparently are unique in the genus.

19. **GALACTIA TEXANA** (Scheele) A. Gray, Boston J. Nat. Hist. 6(2): 170. 1850. *Lablab texanus* Scheele, Linnaea 21: 467. 1848. **TYPE: USA. Texas**. Protologue: "Prope Neubraunfels leg. Lindheimer. Julio." Jul 1846, *F. Lindheimer Fasc. III 368* (holotype: CAS or W?; isotypes: NY-fragments [origin unspecified] digital image!, US digital image!, SI-fragments ex GH, US, W digital images!).

Perennial herbs, arising from a slender, elongate, woody taproot. **Stems** climbing-twining, lignescent proximally, hirsute-strigose to strigose with loosely appressed, retrorse hairs. **Leaflets** 3, blades elliptic to broadly elliptic or oblong-elliptic, (15–)20–42 x 10–25(–32) mm, herbaceous, not glaucous, glabrous to sparsely strigose adaxially, sparsely strigose abaxially with closely appressed hairs to softly hirsute with ascending hairs, veins raised or not on both surfaces, apices obtuse to rounded or shallowly retuse. **Inflorescence** axis 0–4(–40) mm, flowers solitary and axillary or 2–4 in a reduced pseudoraceme. **Calyces** ca. 6 mm, loosely strigose to hirsute-strigose or hirsute. **Corollas** 8–11 mm, pink, rose, reddish, or purple-cream. **Fruits** 30–60 x 4–6 mm, falcate, sparsely minutely strigulose with closely appressed hairs. **Seeds** (3–)6–10.

Flowering Jun–Jul(–Aug). Oak-juniper, ash-juniper, and oak woodlands, valley and canyon bottoms, roadbanks, gravelly limestone outcrops and slopes, streamsides and terraces, limestone alluvium, rocky clay; 350–500 m; Tex.; Mexico (Coahuila, Nuevo Léon, Tamaulipas), South America (Argentina). Map 16; Mexican distribution not shown.

Galactia texana is characterized by its twining stems, short, few-flowered inflorescence, and falcate fruits. Burkart (1971, p. 708) described *G. texana* var. *degasperii* Burkart (*A. Burkart 20288*, SI digital image!) from several collections from two adjacent provinces (Chaco and Formosa) of Argentina, apparently allopatric with var. *texana* in Argentina (Catamarca, Córdoba, La Rioja, Salta, San Luis, Santiago del Estero, and Tucumán provinces, as cited by Burkart). It differs from var. *texana* in its longer stems, smaller corollas (5–8 mm long vs. 10–13 mm for var. *texana* in Argentina, 8–11 mm in Texas) and strigose-sericeous fruits (vs. minutely strigulose elsewhere). Whether they intergrade in Argentina is not clear, and the evolutionary-taxonomic status of var. *degasperii* is in need of study.

20. **GALACTIA PINETORUM** Small, Fl. Miami 93, 200. 1913. **TYPE: USA. Florida**. Miami-Dade Co.: In pinelands, between Cocoanut Grove and Cutler, 9 May 1904, *J.K. Small* and *P. Wilson 1592* (holotype: NY digital image!).

Perennial herbs, from a woody, elongate, cylindric to fusiform or obfusiform taproot. **Stems** procumbent, not twining, herbaceous, minutely and sparsely strigulose with retrorse or rarely antrorse hairs. Leaflets 3, blades linear-oblong or narrowly oblong to narrowly lanceolate, narrowly elliptic-lanceolate, or linear-elliptic, 20–55 x 2–8(–11) mm, coriaceous, glabrous adaxially, glabrate

to sparsely strigulose abaxially, sometimes glaucous, venation prominently raised on both surfaces, apices rounded to obtuse. **Inflorescence** axis 30–150 mm, flowers solitary and axillary or 2–8(–10) in a reduced pseudoraceme, usually in distal 1/2–1/4 of axis. **Calyces** 5–9 mm, strigulose. **Corollas** 11–15 mm, blue to purple or purplish or pink-purple. **Fruits** 25–50 x 4 mm, straight, densely strigose to strigulose with minute hairs. **Seeds** 5–7.

Flowering all year. Disturbed sites, among palmettos, dry sand; 0–25 m; Fla. (Brevard, Dade, and Monroe cos.). Map 10.

Collections examined. **Florida**. Brevard Co.: 4 mi N of Eau Gallie, 19 Apr 1957, *Melvin s.n.* (NCU). Dade Co.: Ludlam Pineland Preserve, SW 67 Ave and ca. 146 St., common in pine rockland, 8 May 1998, *Bradley 1670* (USF); Miami, 1 Apr 1903, *Britton 2270* (USF); Coral Gables, Acona at Red Road, vacant pine lot, [date] *Broome s.n.* (USF - 2 sheets); Univ. of Miami campus under pine, 10 Sep 1966, *Broome s.n.* (USF); Southern part of peninsula, May-Jun 1904, *Eaton 987* (LL, USF); edge of woods on Jenning's Estate, near FTG Lab, 1 Jul 1974, *Fawcett s.n.* (NCU); pineland remnant at vic. of SW 50 Terr and 69 Ave, Miami, 11 May 1975, *Hill 2979* (NCU); SW of Homestead, Everglades Natl. Park, 30 Mar 1963, *Lakela 25734* (USF); vicinity of Old Cutler Road and Fairchild Tropical Garden, margin of pineland, pond terrace, 17 Jul 1964, *Lakela 27269* (USF); Coral Gables, vicinity of Old Cutler Road, few plants over Miami oolite, 3 Apr 1965, *Lakela 28438* (USF); Homestead, W side of Krome Ave., wooded, vacant lot, 1 Jul 1965, *Lakela 28773* (USF); Homestead, unbuilt lot, pineland, 26 Apr 1966, *Lakela & Long 29704* (USF); Buena Vista, climbing over weeds, 8 Feb 1930, *Moldenke 580a* (LL, MU-fide M. Vincent); Buena Vista, dry sandy soil among palmettos, 18 Dec 1929, *Moldenke 268* (LL, MU-fide M. Vincent). Monroe Co.: Long Pine Key, 22 Apr 1960, *Craighead s.n.* (USF).

Galactia pinetorum is distinctive in its procumbent (non-twining) stems usually with retrorse hairs, very narrow leaflets with raised venation, and relatively large flowers. Stems of Moldenke collections have antrorsely oriented hairs — this variation analogous that seen also in *G. brachypoda*, *G. joselyniae*, *G. microphylla*, and *G. smallii*. The other linear-leaflet species of south Florida, *G. grisebachii*, has twining stems with consistently antrorse hairs, leaflets without prominently raised venation, and smaller flowers.

21. **GALACTIA GRISEBACHII** Urb., Symb. Antill. 5: 372. 1908 [nom. nov., replacing *G. stenophylla* Urb.]. *Galactia stenophylla* Urb., Symb. Antill. 2: 313. 1900 (not *G. stenophylla* Hook. & Arn., Bot. Misc. 3: 182. 1833, from Uruguay = *Collaea stenophylla*). **LECTOTYPE** (designated here): **CUBA**. No other locality data, 1860-1864, *C. Wright 2335* (BREM digital image! Figure 12a; isolectotypes: B [presumably destroyed], K digital image! Figure 12b, US digital image!, W). Protologue: "Hab. in Cuba: Wright n. 2335 p.p. (hb. Brem. [BREM], Krug et Urb. [B], Vindob. [W])." Figure 13.

Dolichos filiformis L., Syst. Nat., ed. 10. 2: 1163. 1759 [not *Galactia filiformis* (Jacq.) Benth. 1840]. **LECTOTYPE** (Fawcett & Rendle in *Fl. Jamaica* (ed. 2) 4: 58. 1920): **JAMAICA**. No other data (LINN 900.13 digital image!). Protologue: "D. foliolis linearibus obtusis mucronatis glabris subtus pubescentibus. *Brown jam.* 294. n. 6." Browne (1756) noted that "This little plant is frequent about *Old-harbour*."

Galactia angustifolia var. *retusa* Wright ex Griseb., Cat. Pl. Cub., 75. 1866. *Galactia parvifolia* A. Rich. var. *heterophylla* Urb., Symb. Antill. 2: 315. 1900 (nom nov. illeg., apparently intended as a substitute for *G. angustifolia* var. *retusa*, which was listed in synonymy). **TYPE**: **CUBA**. GH label: "prope villam Monte Verde dictam, Cuba Orientali, Jan.-Jul. 1859," C. *Wright 1179* (holotype [fide annotation by R. Howard 1984]: GOET digital image!; isotypes: GH digital image!, US digital image!). The GOET label data give only "in Cuba Orientali, ... 1860," *C. Wright 1179*.

Figure 13. *Galactia grisebachii* Urb. a. Lectotype, BREM b. Isolectotype, K.

Perennial herbs, from an elongate taproot. **Stems** climbing-twining, filiform, herbaceous, sparsely and minutely strigose with antrorse hairs. **Leaflets** 3, blades linear-oblong to narrowly oblong or narrowly elliptic, (10–)15–40 mm x 2–4(–6) mm, herbaceous, sparsely strigose to glabrous adaxially, weakly glaucous and sparsely minutely strigose abaxially, veins not raised, apices rounded to obtuse. **Inflorescence** axis 10–40(–130) mm, flowers solitary and axillary or 2–5(–10) in reduced

pseudoracemes. **Calyces** 5–6 mm, strigose. **Corollas** 7–9 mm, pink to blue, purple, or lavender. **Fruits** (20–)25–45 x 3–5 mm, straight, sparsely strigose. **Seeds** (3–)8–10.

Flowering all year. Pinelands, pine-palmetto, hammocks, weedy grassland, sandy fields, beaches; 0–20 m; Fla. (Dade, Lee, and Monroe cos.); West Indies (Bahamas?, Cuba!, Hispaniola!, Jamaica!, Puerto Rico?). Map 10.

Collections examined. **USA**. **Florida**. Dade Co.: Everglades Natl. Park, Omissa Bauer Hammock, 26 Sep 1961, *Craighead s.n.* (USF); NE side of Homestead by US 1, oolitic clearing in slash pineland, 19 Sep 1973, *Kral 51831* (VDB); ca. 2 mi due W of Florida City, in slash pine-palmetto, 23 Aug 1980, *Kral 66245* (VDB); Univ. of Miami campus, bordering uncut RR tracks, 10 Sep 1966, *Lakela 30212* (USF). Lee Co.: Sanibel Island, sandy field, 16 Oct 1969, *Radford 45549* (NCU). Monroe Co.: Big Pine Key, 5 Mar 1943, *Cornman 2104* (MO); Big Pine Key, along E-W street along N side of prison, 0.5 mi N of US 1, weedy roadside along open woodland, 18 Aug 1987, *Hansen & Richardson 11448* (USF); Florida Bay, Cape Sabel, Middle Cape, sandy beach, 7 May 1965, *Lakela 28582* (USF-2 sheets); Big Pine Key, 9 Jun 1973, *Lakela 32215* and *32215A* (USF); Big Pine Key, N end, pineland, 22 Oct 1965, *Lakela 29286* (USF); S end of Big Pine Key, martime strand, 6 Aug 1966, *Long 2014* (USF); Big Pine Key, pineland and hammock near Watsen's Hammock, 11 Feb 1967, *Long 2453* (USF); central part of Big Pine Key, pineland, 18 Dec 1974, *Poppleton & Shuey s.n.* (USF); Big Pine Key, pineland-palmetto forest, *Radford 45853* (NCU); Big Pine Key, along Fla 940, 1.8 mi NW of US 1, pineland, 14 Mar 1982, *Sauleda 7039* (USF); E end of Packet Key, 17 May 1965, *Wiggins 20079* (USF).

These consistently linear-oblong-leaflet plants, easily recognized, of Florida have previously been identified as *Galactia parvifolia*, but in the interpretation here, that name has been misapplied. *Galactia parvifolia* (Figure 14) has broadly oblong to oblong-elliptic leaflets from base to the top of the stem, distinct from the consistent linear shape of the Florida plants. Various Caribbean treatments have noted that leaflet shape is variable within *G. parvifolia*. In the Dominican Republic, Cuba, and the Bahamas (Liogier 1985; Sauget & Liogier 1951; Beyra M. et al. 2005; Correll & Correll 1982), leaflets have been described as linear to oblong, elliptic-oblong, ovate, and suborbicular, without qualification as to position of the leaves on the stem.

Galactia parvifolia A. Rich., Hist. Phys. Cuba, Pl. Vasc. 1: 414. 1845. **Type**: **CUBA**. [**Prov. Pinar del Río**]. "Crescit in Vuelta de Abajo," no locality data except "Cuba" on the specimen, *Ramon de la Sagra s.n.* (probable holotype, but "isotype" as labeled: P, cat. P00798723 digital image!; **Figure** 13). P00798723 has twining stems, small and oblong-elliptic leaflets, obtuse to truncate at both ends and apically emarginate, short-pedunculate and 2-5-flowered racemes, and narrow and villous legumes. Richard's protologue essentially matches P00798723 and notes that *Galactia parvifolia* is particularly distinguished by the small, elliptic leaflets, presumably hence the deriviation of the epithet. A different specimen (P00798722 digital image!), also collected in "Cuba" by de la Sagra and identified on the sheet as the "holotype" of *G. parvifolia*, has trailing (non-twining) stems, is completely leafless (leaves have fallen off), and the fruits are broad and apparently nearly glabrous — it appears to be a different species from P00798723 and is not the plant described by Richard.

A sheet at F (936748) was annotated by W.T. Gillis in 1977 as "holotype fragment" of *Galactia parvifolia* A. Rich — it includes a few short, oblong to oblong-lanceolate leaflets, a segment of an elongate inflorescence, pieces of a broad pod, and several seeds. The relatively broad fruits and long inflorescence of the F fragments are similar to P00798722, not to P00798723. One might suspect, however, that the leaves were taken from P00798723 and that the F sheet is an admixture.

Figure 14. Probable holotype of *Galactia parvifolia* A. Rich (see text).

In the original description of *Galactia stenophylla*, Urban contrasted the "obtuse to rotundate" leaflets of basal leaves with the linear ones of cauline leaves. Similarly, Small (1913b) noted that for Florida plants the lower cauline leaflets are broader than those of distal leaves, "varying from ovate or oval to obovate," but all Florida collections I have seen (as cited above) have uniformly linear leaflets, from proximal to distal leaves. For Jamaica, Adams (1972) described leaflets of *G. parvifolia* as 2–3 mm wide — which is characteristic of a linear to linear-oblong shape and within the morphological range of the Florida plants. In fact, *Dolichos filiformis* L., the earliest name for these linear-leaflet plants, was described from Jamaica — it is blocked from transfer to *Galactia* by the later combination *Galactia filiformis* (Jacq.) Benth. from 1837, representing a heterotypic and more distantly related species of Hispaniola.

In the protologue of *Galactia stenophylla*, Urban noted that it was perhaps nothing but a variety of *G. parvifolia* ("Fortasse nihil aliud nisi varietas G. parvifoliae A. Rich."), but eight years later, in providing a replacement name for *G. stenophylla*, he still considered it worthy of recognition. Urban's course is followed here in treating the linear-leaflet plants, which grow at least in Cuba, Hispaniola, Jamaica, and Florida, as a species distinct from *G. parvifolia*.

EXCLUDED SPECIES

Galactia watsoniana Holmes & Singhurst (2008) is a synonym of *Cologania pallida* Rose. It was described from Bandera County in south-central Texas, from the Love Creek Preserve of the Nature Conservancy of Texas. Plants of essentially identical morphology occur disjunctly separated from Bandera County in Jeff Davis and Brewster counties, Texas, and equally close or closer populations occur in Coahuila, Mexico.

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APPENDIX. **Worldwide species of *Galactia* (identified only by epithet).** Underlined names appear in a preceding geographic area and are not counted again. In this account, the genus includes 111 total species.

USA (21 species): brachypoda, canescens, elliottii, erecta, fasciculata, floridana, grisebachii, heterophylla, joselyniae, longifolia, marginalis, microphylla, minor, mollis, pinetorum, regularis, smalli, striata (incl. spiciformis), texana, volubilis, wrightii

WEST INDIES (45 species; 4 also in USA = 41): acunana, bahamensis, brachyodon, buchii, caimitensis, carnea, combsii, cuneata, dictyophylla, dubia, earlei, eggersii, excisa, filiformis, fuertesii, galactioides, glaucescens, grisebachii, herradurensis, isopoda, jenningsii, jussiaeana, laxiflora, leucocarpa, lignosa, longiflora, longifolia, maisiana, minutifolia, monophylla, nummularia, ocoana, parvifolia, pendula, revoluta, rotundata, rubra, rudolphoides, sangsterae, savannarum, schomburgkii, striata, suberecta, synandra, uniflora

MEXICO (17 species; 7 also in USA and WEST INDIES = 10): acapulcensis, acuminata, argentea, belizensis, brachystachys, canescens, densiflora, discolor, heterophylla, incana, joselyniae, multiflora, retusa, striata, texana, viridiflora, wrightii

CENTRAL AMERICA (9 species; 5 also in areas above = 4): acapulcensis, anomala, argentea, belizensis, discolor, multiflora, serpentina, sparsiflora, striata

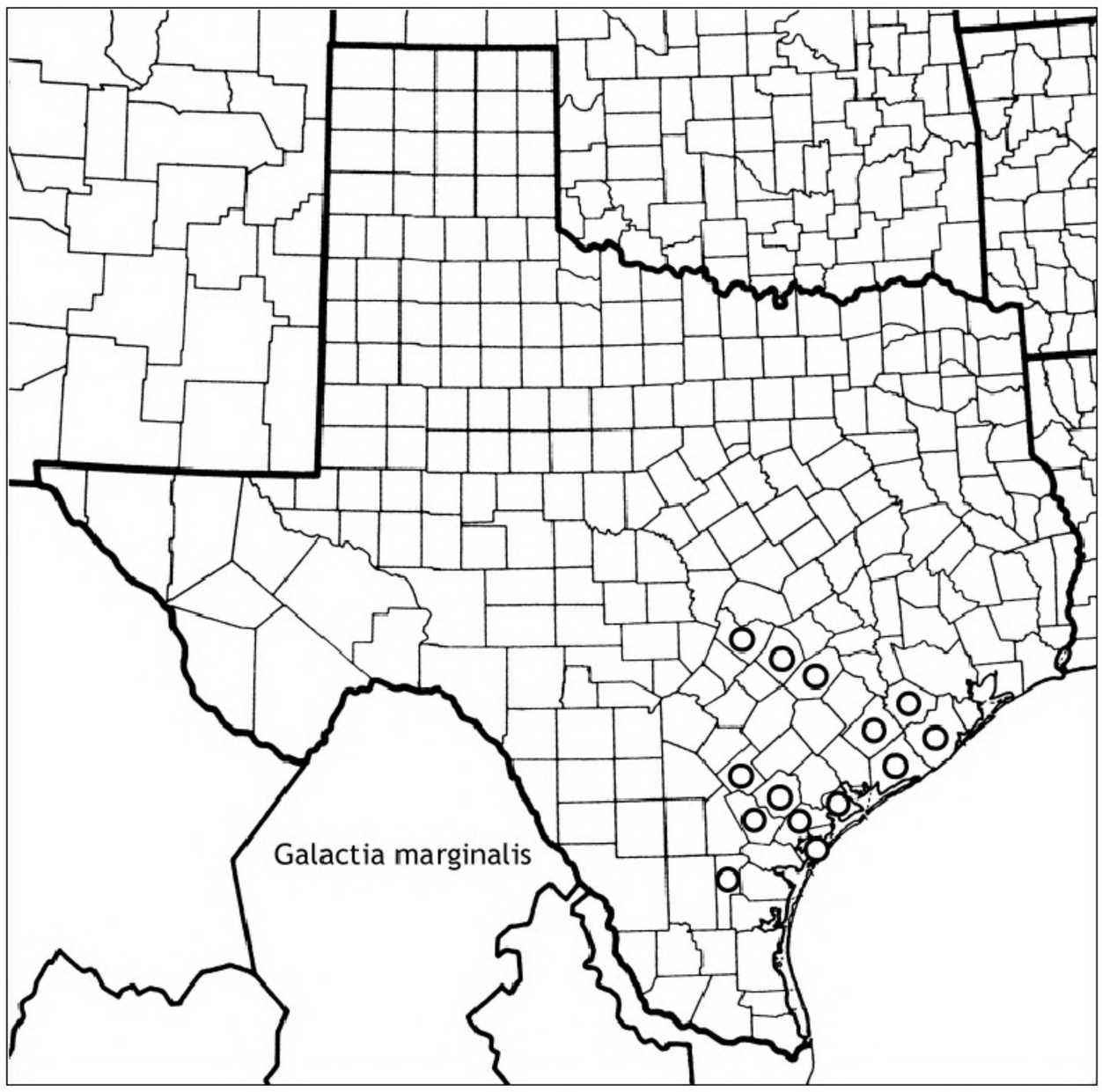
SOUTH AMERICA (39 species; 7 also in areas above = 32): augustii, australis, benthamiana, boavista, bullata, cordifolia, crassifolia, decumbens, dimorpha, dimorphophylla, douradensis, dubia, eriosematoides, fiebrigiana, glaucescens, glaucophylla, gracillima, grewiifolia, heringeri, hoehnei, irwinii, jussiaeana, lamprophylla, latisiliqua, lindenii, longifolia, marginalis, martii, martioides, montana, neesii, peduncularis, pretiosa, remansoana, shumbae, stereophylla, striata, tenuiflora, texana, weddelliana

AUSTRALIA (3 species; 1 also in areas above = 2): megalophylla, muelleri, tenuiflora

ASIA (2 species; 1 also in areas above = 1): tashiroi, tenuiflora

AFRICA (1 species, also in areas above = 0): tenuiflora

Map 1.



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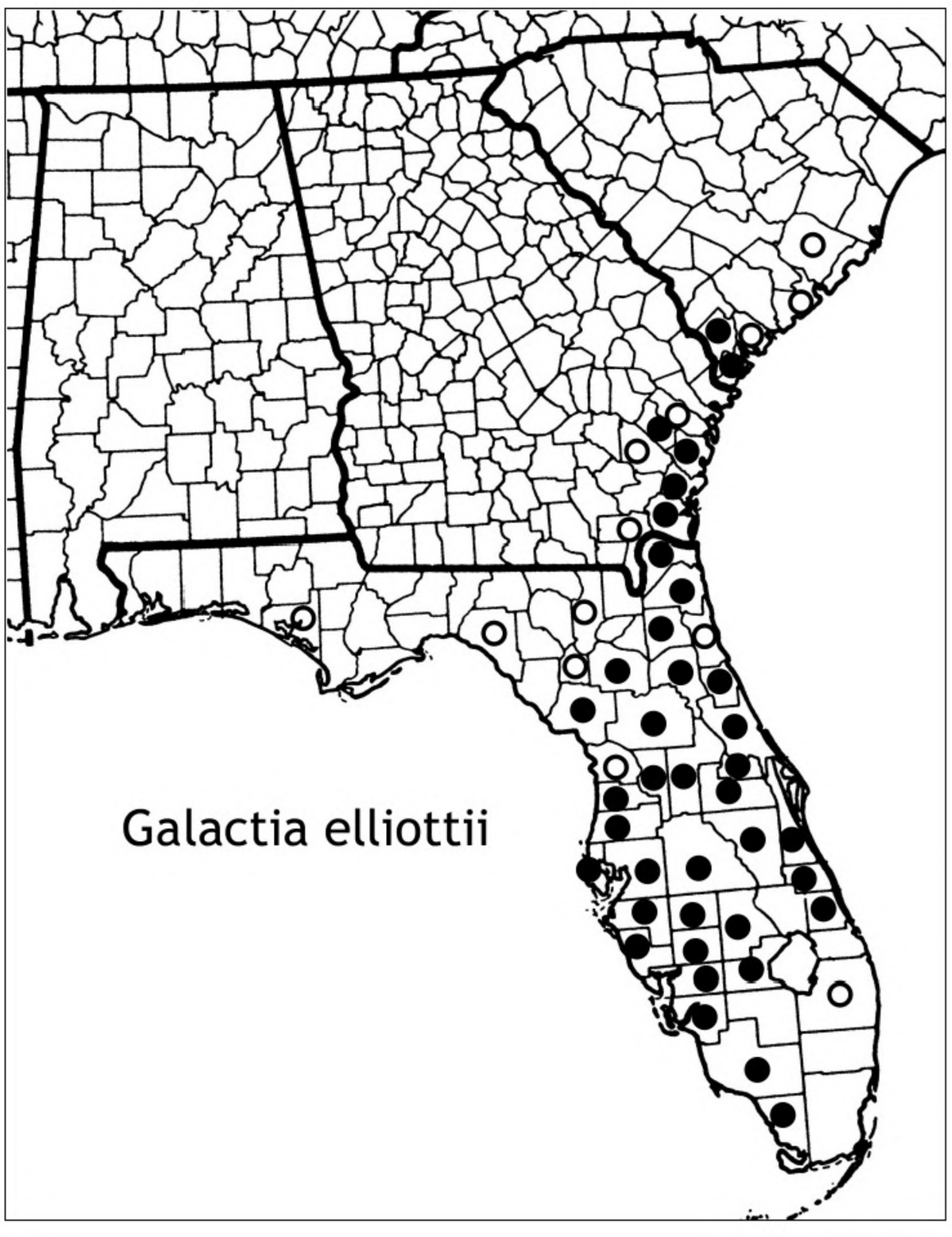

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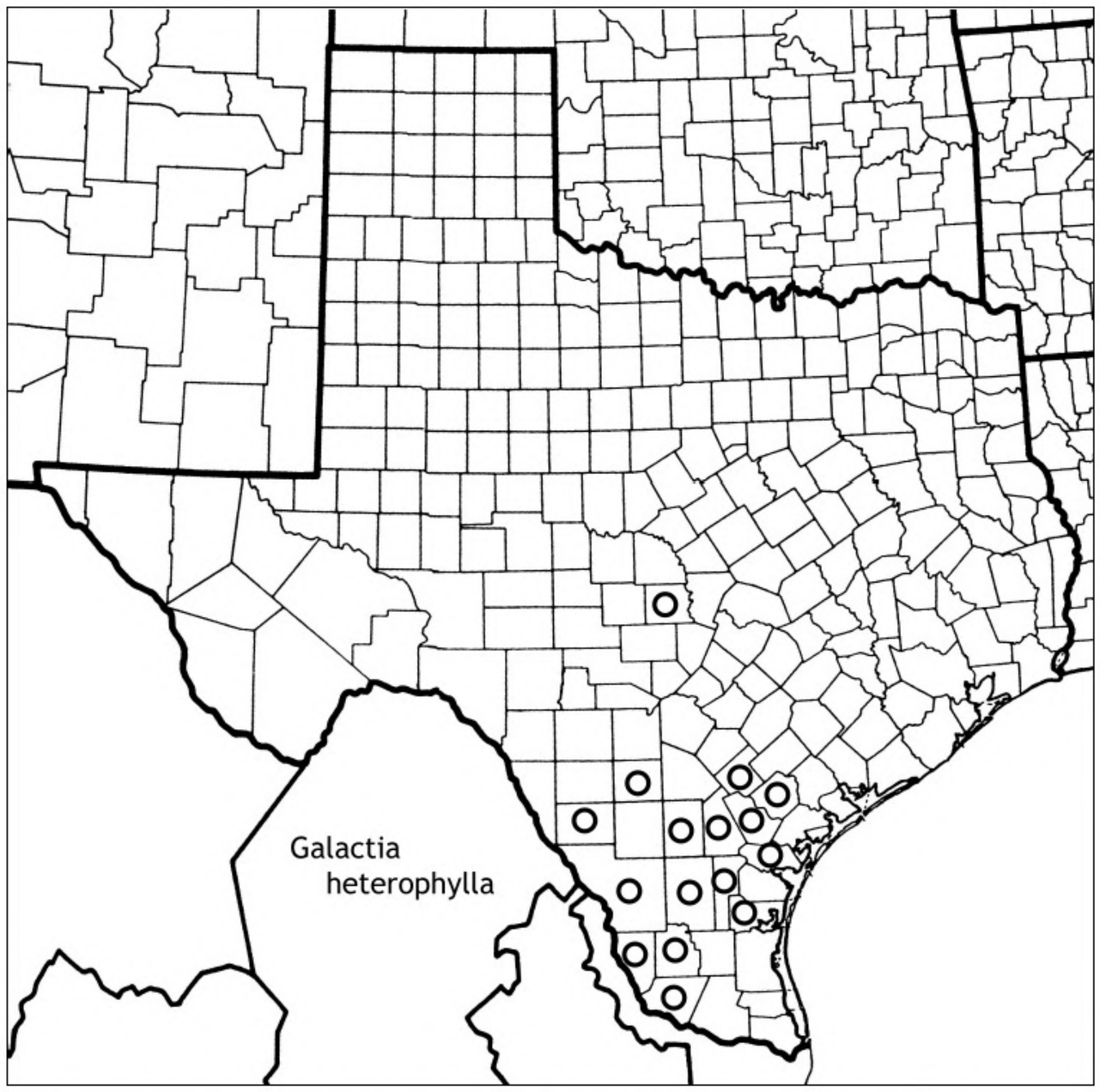
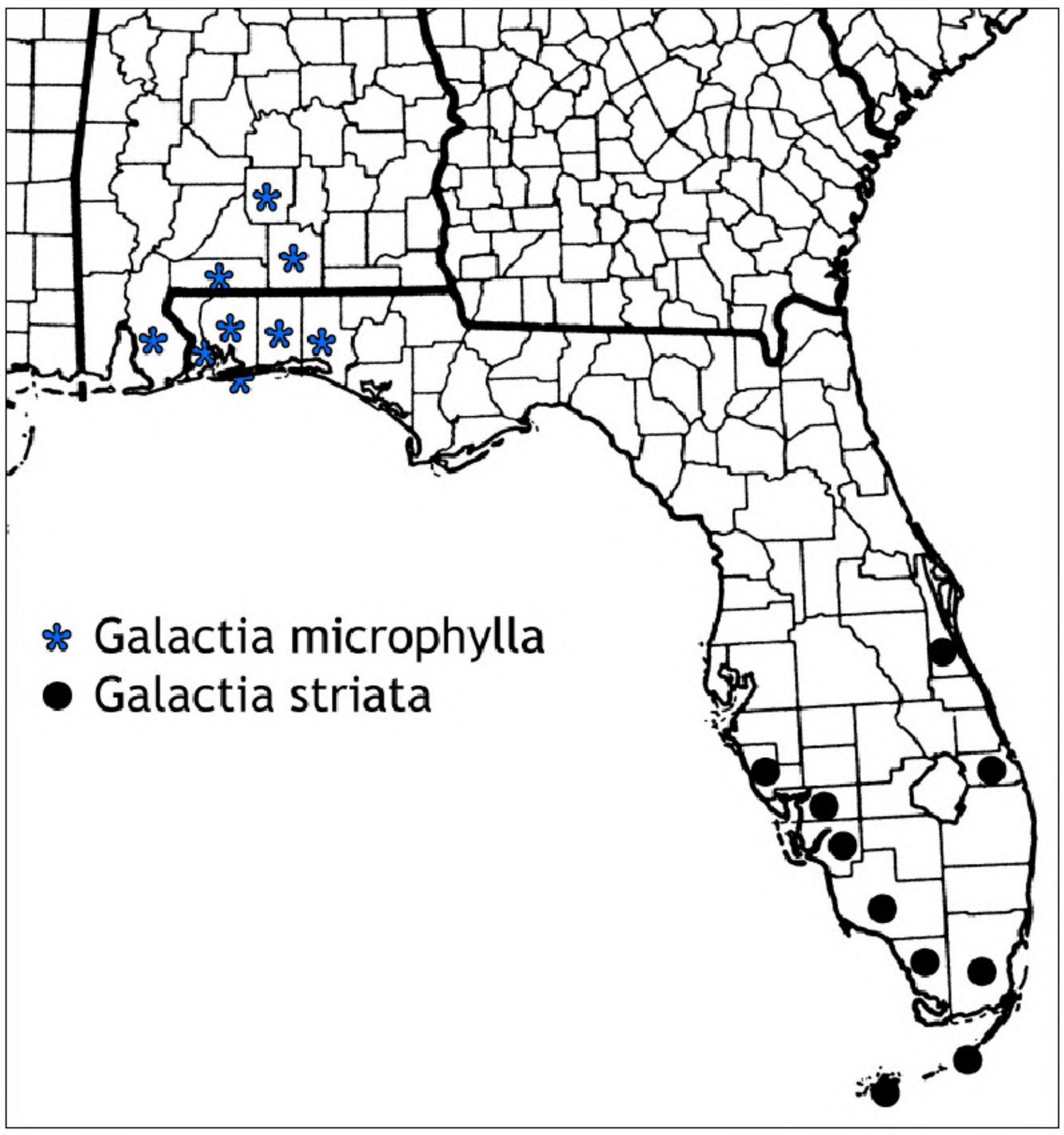
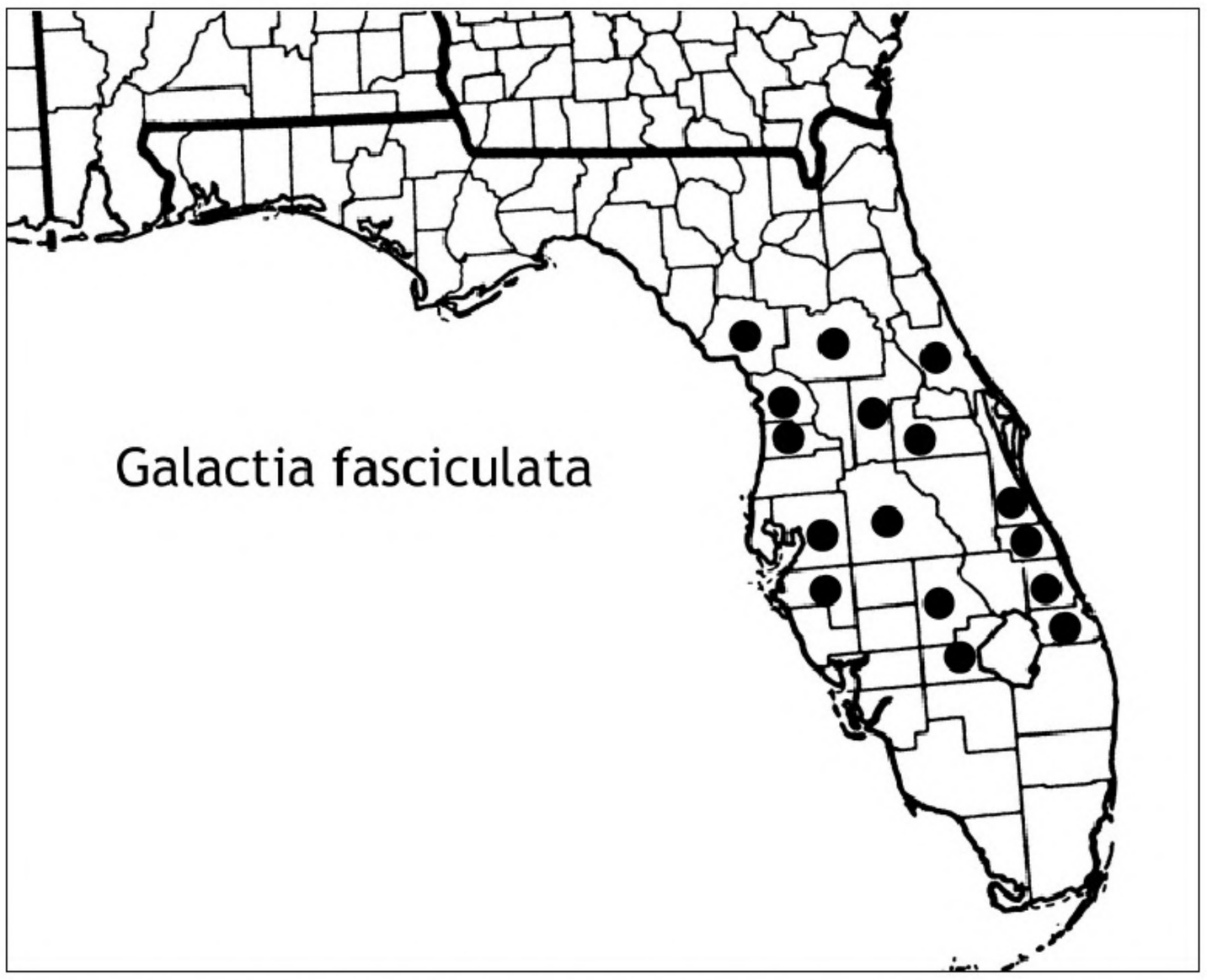

Galactia
heterophylla

Map 4.


Galactia microphylla
Galactia striata

Map 5.



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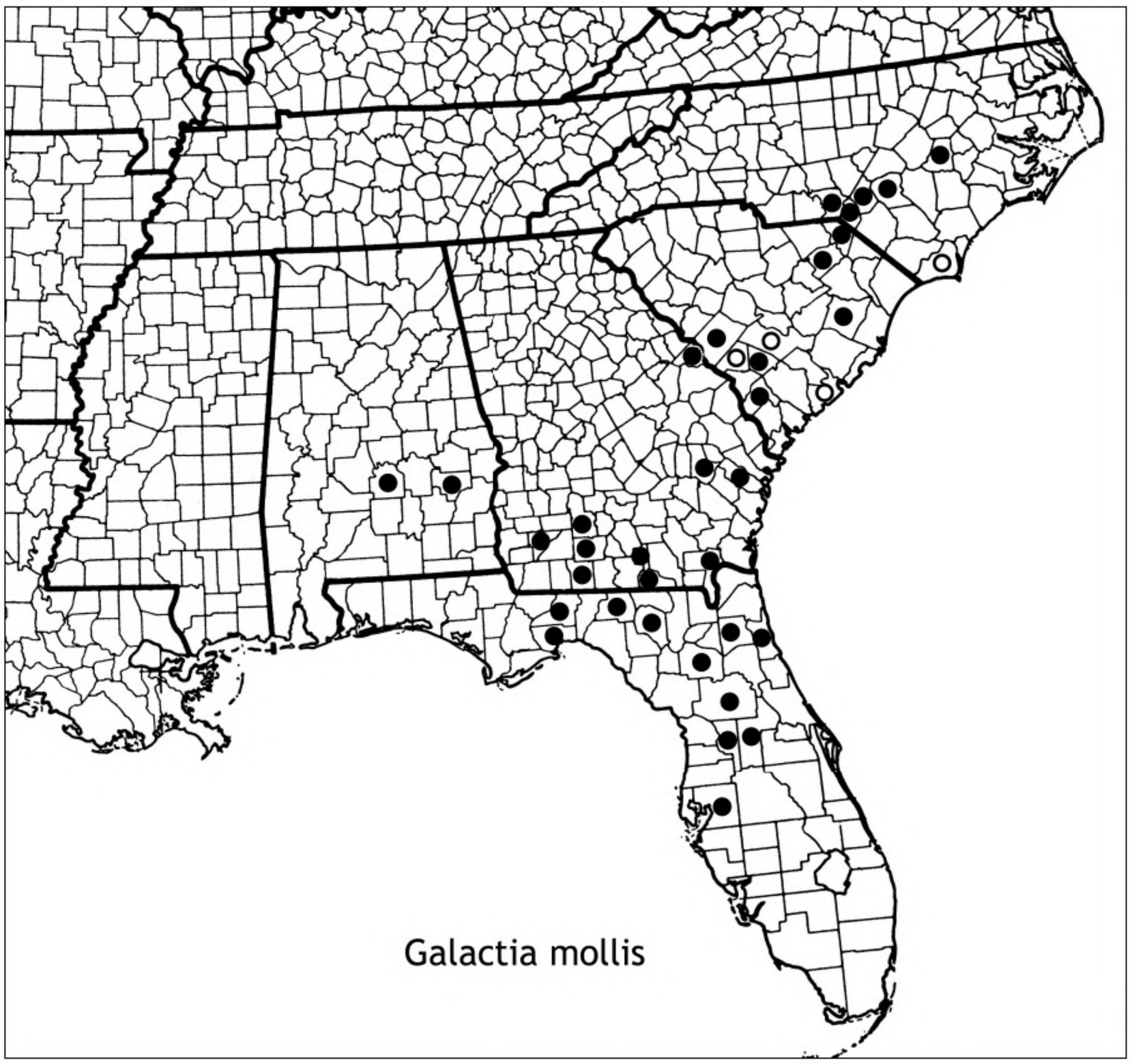

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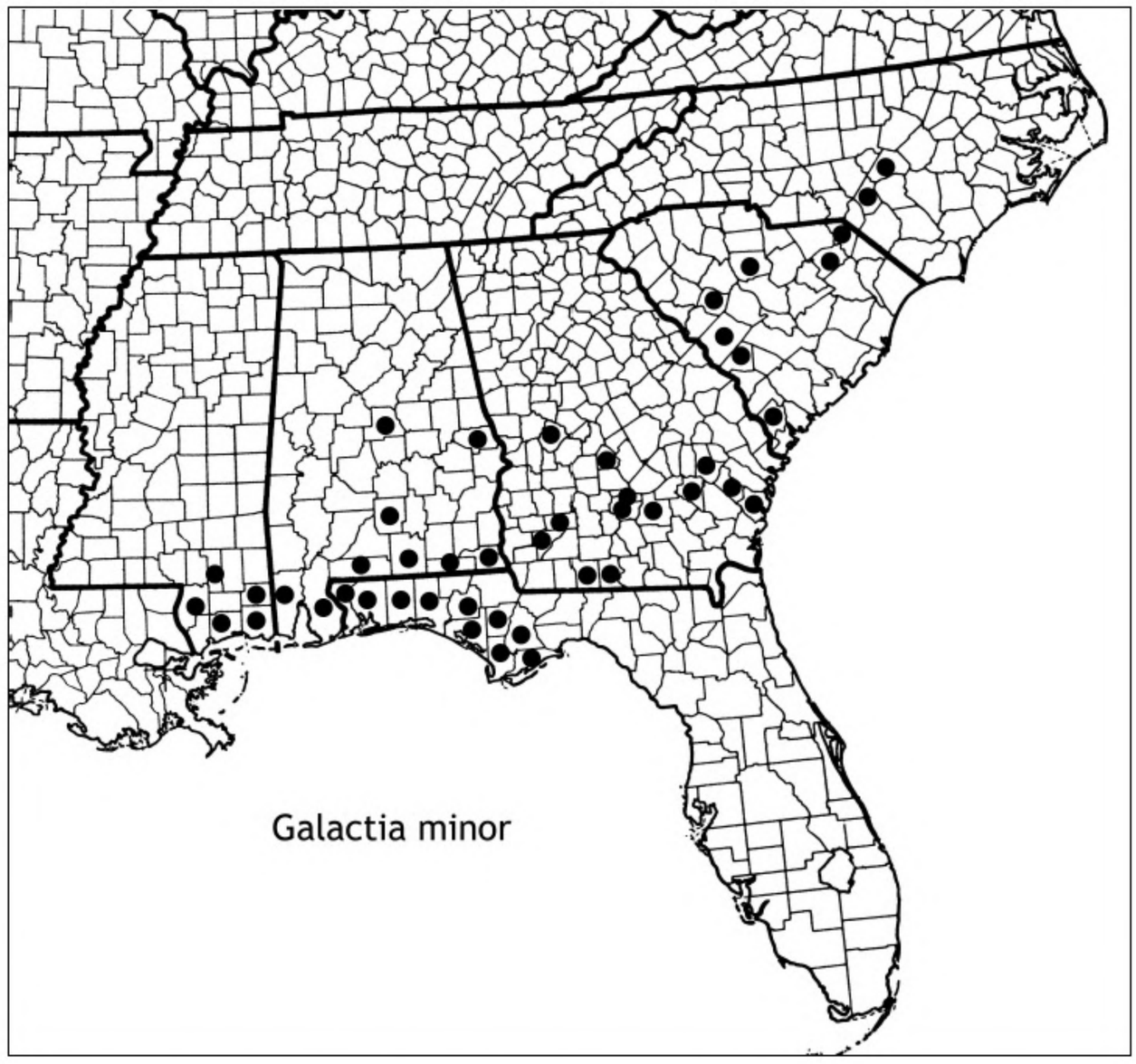

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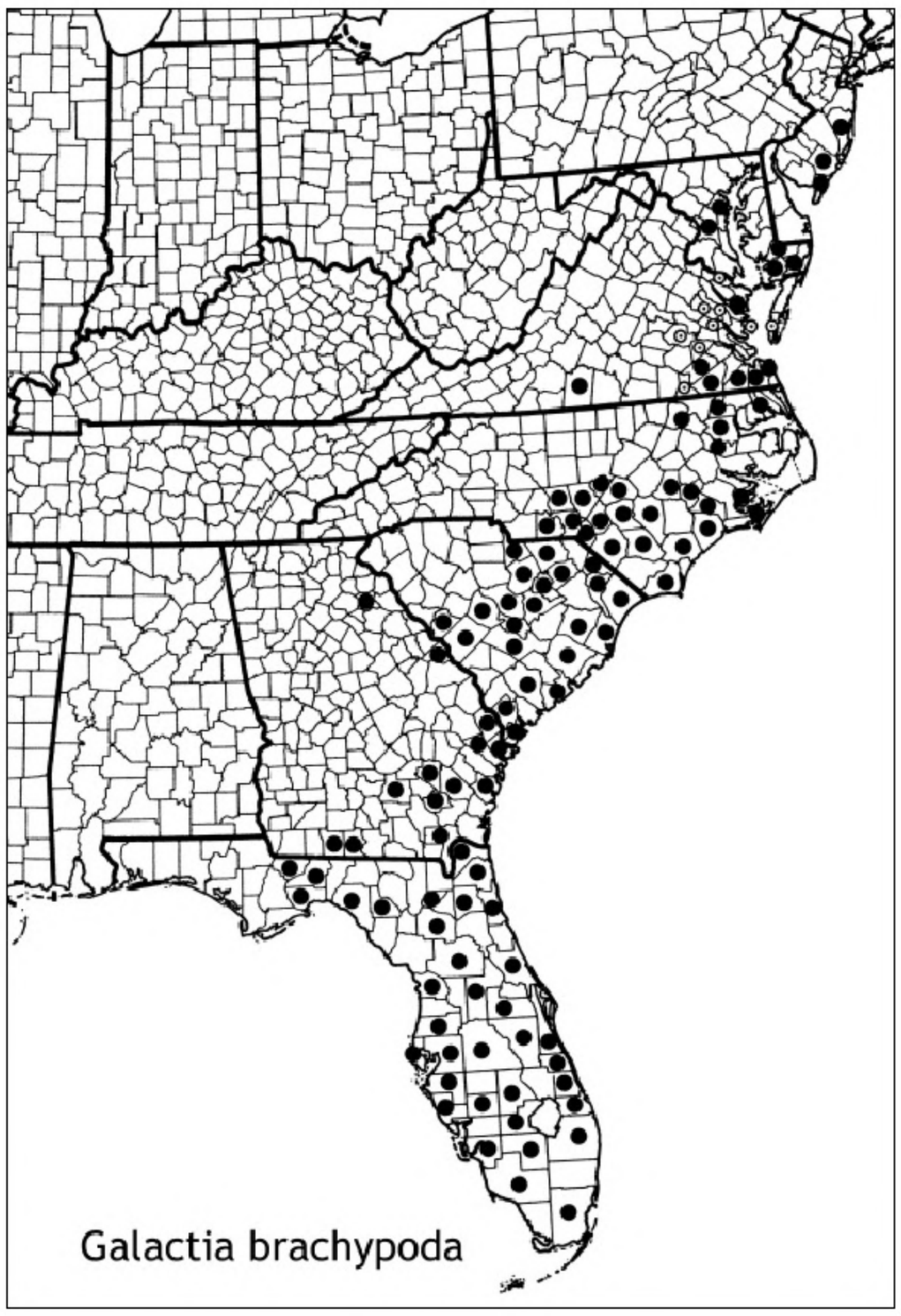
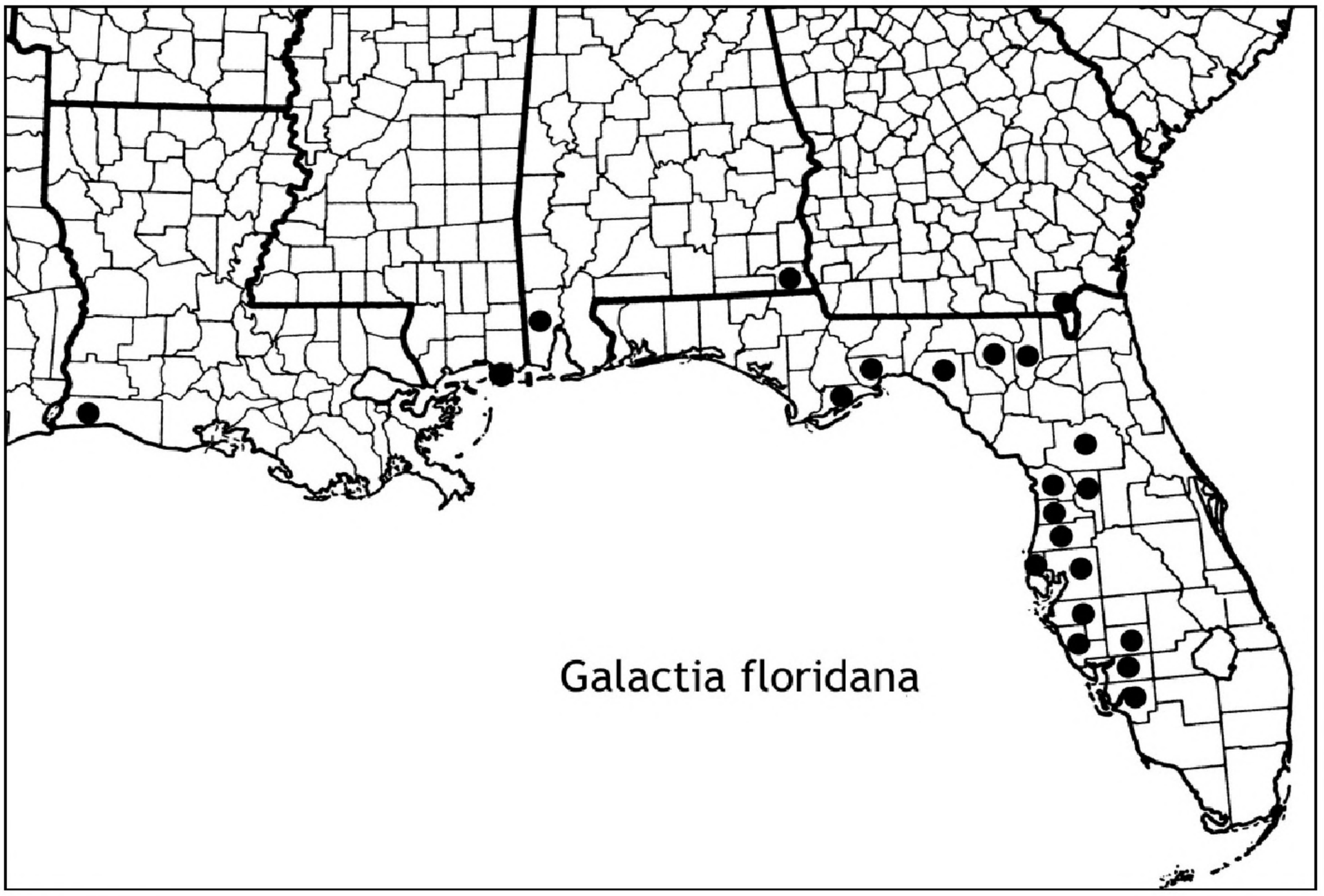
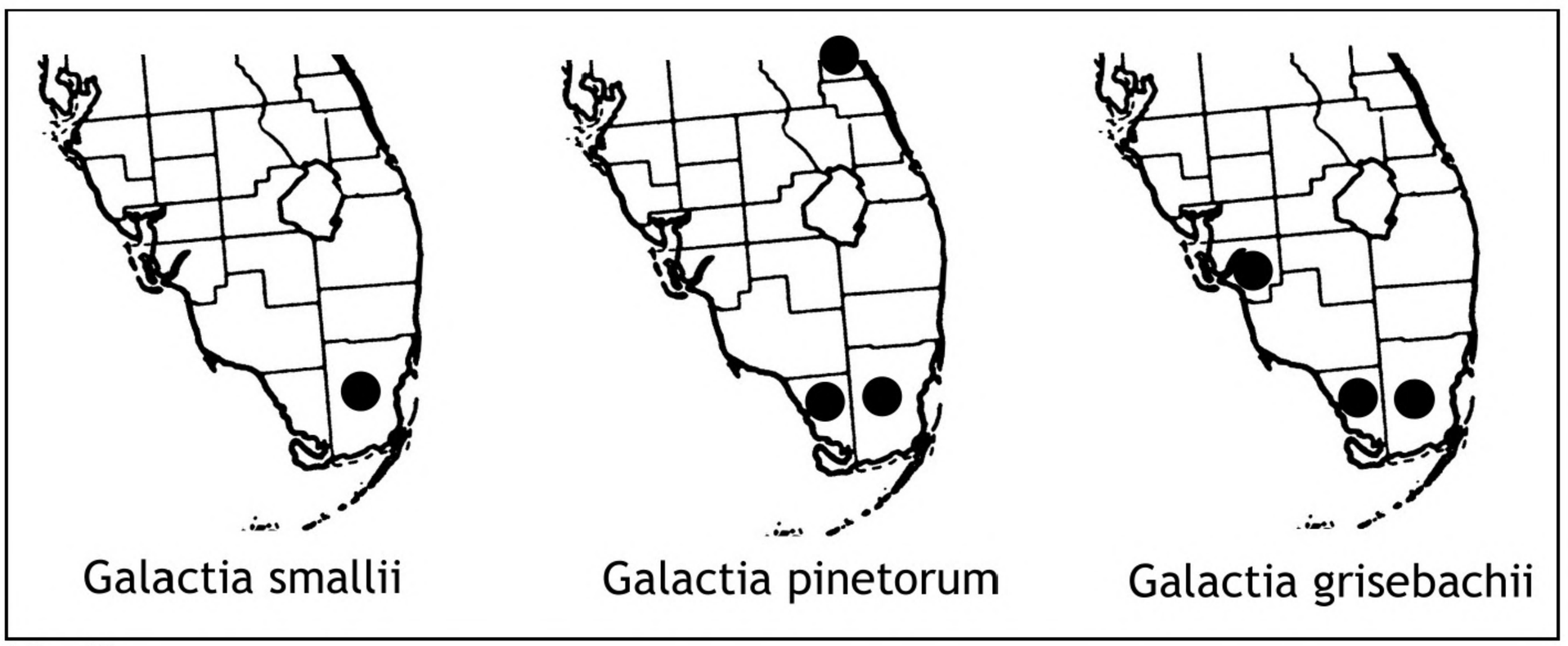
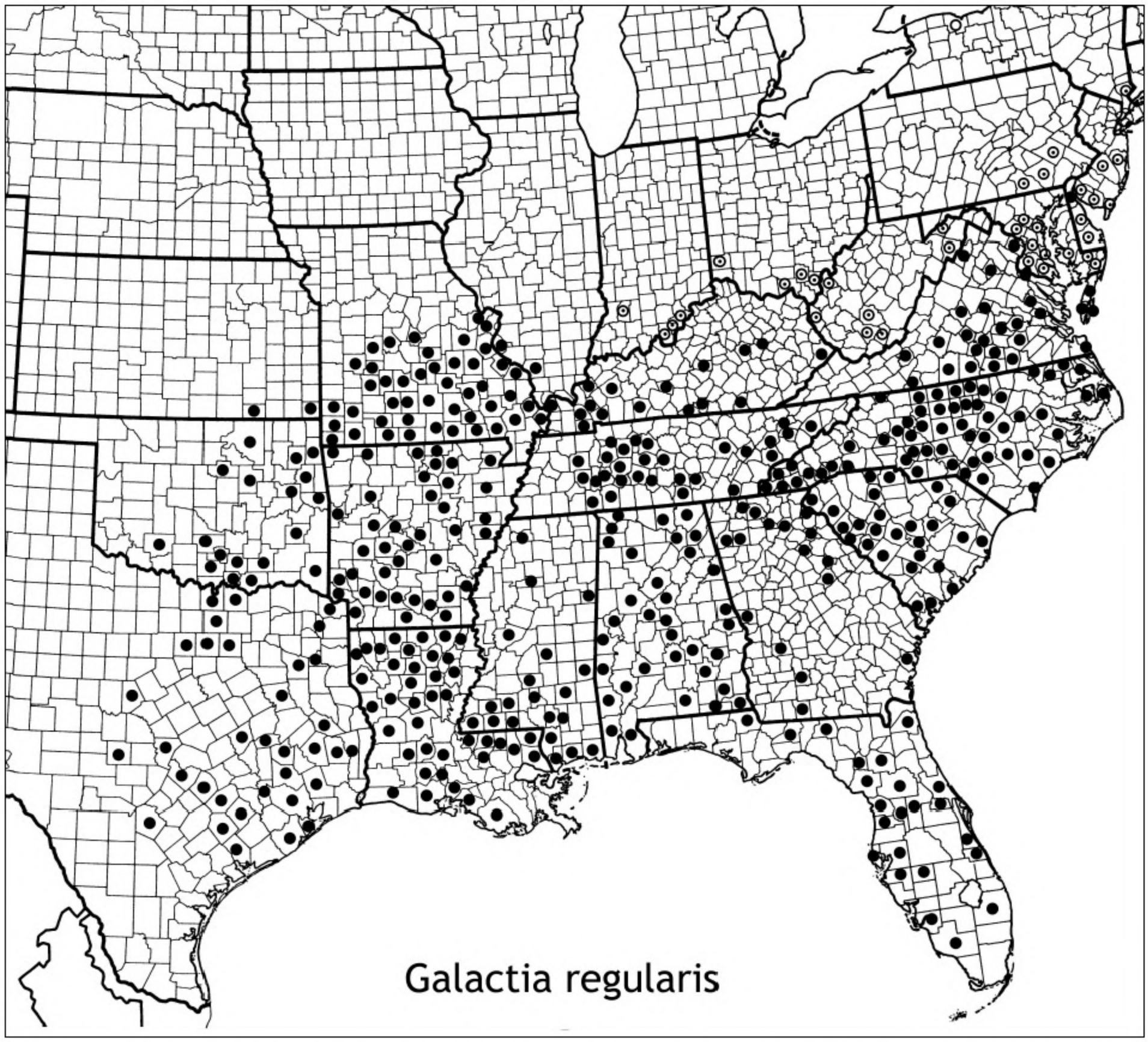



Galactia floridana

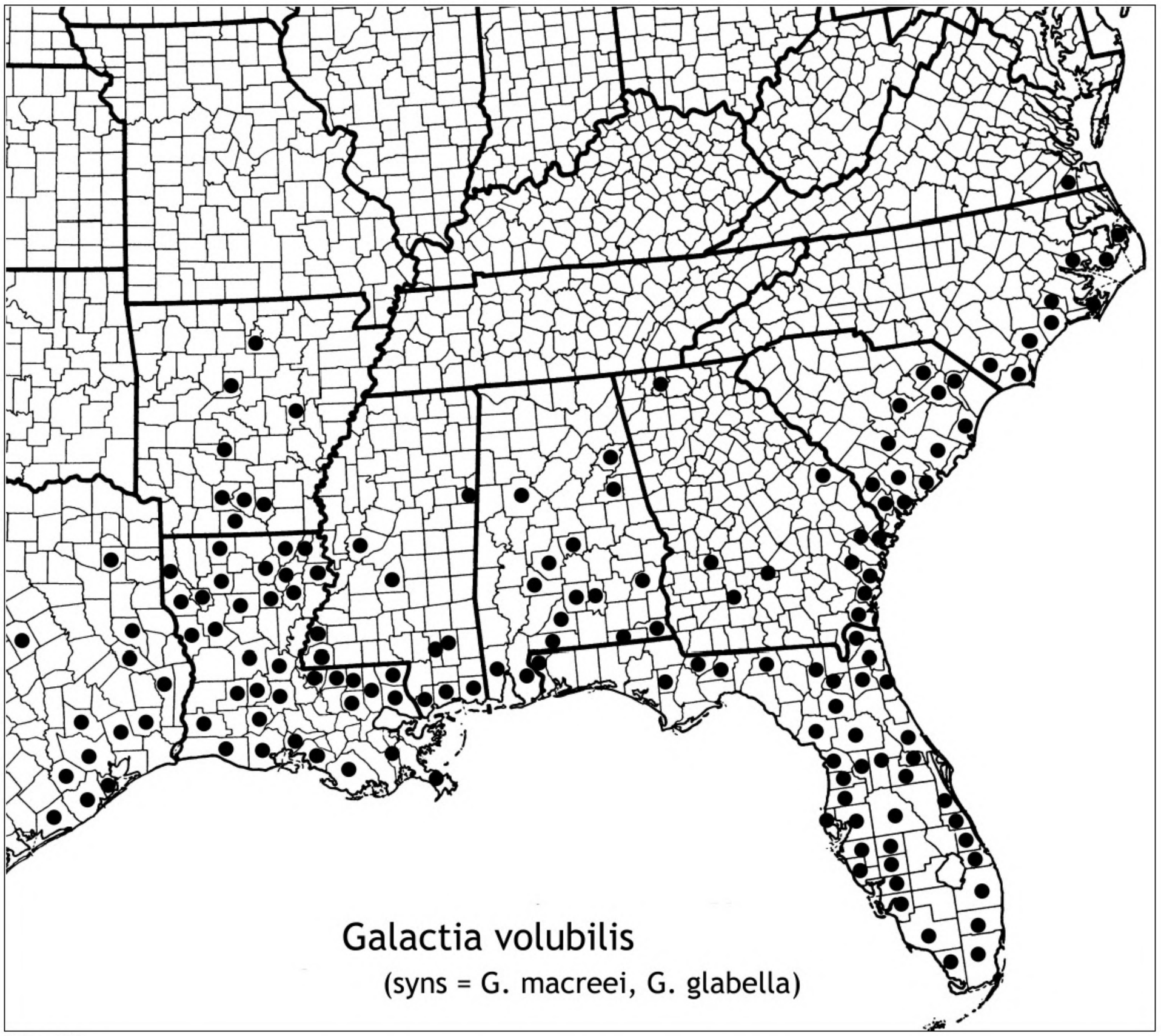
Map 9.


Galactia smallii
Galactia pinetorum
Galactia grisebachii

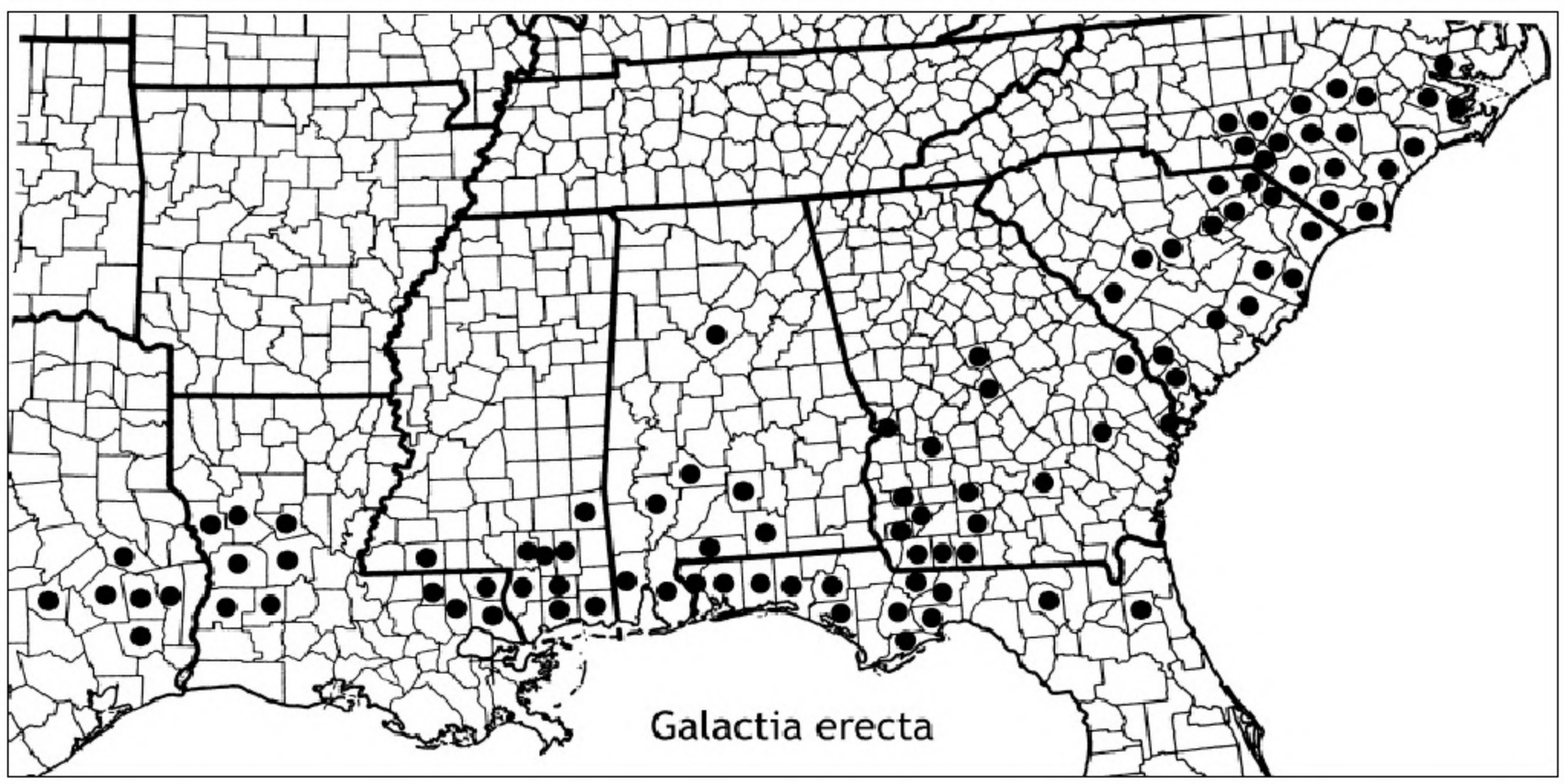
Map 10.



Map 11. Northern records without specimens examined in the present study added from various sources — because there is no other species of *Galactia* in this area, the identifications seem secure.

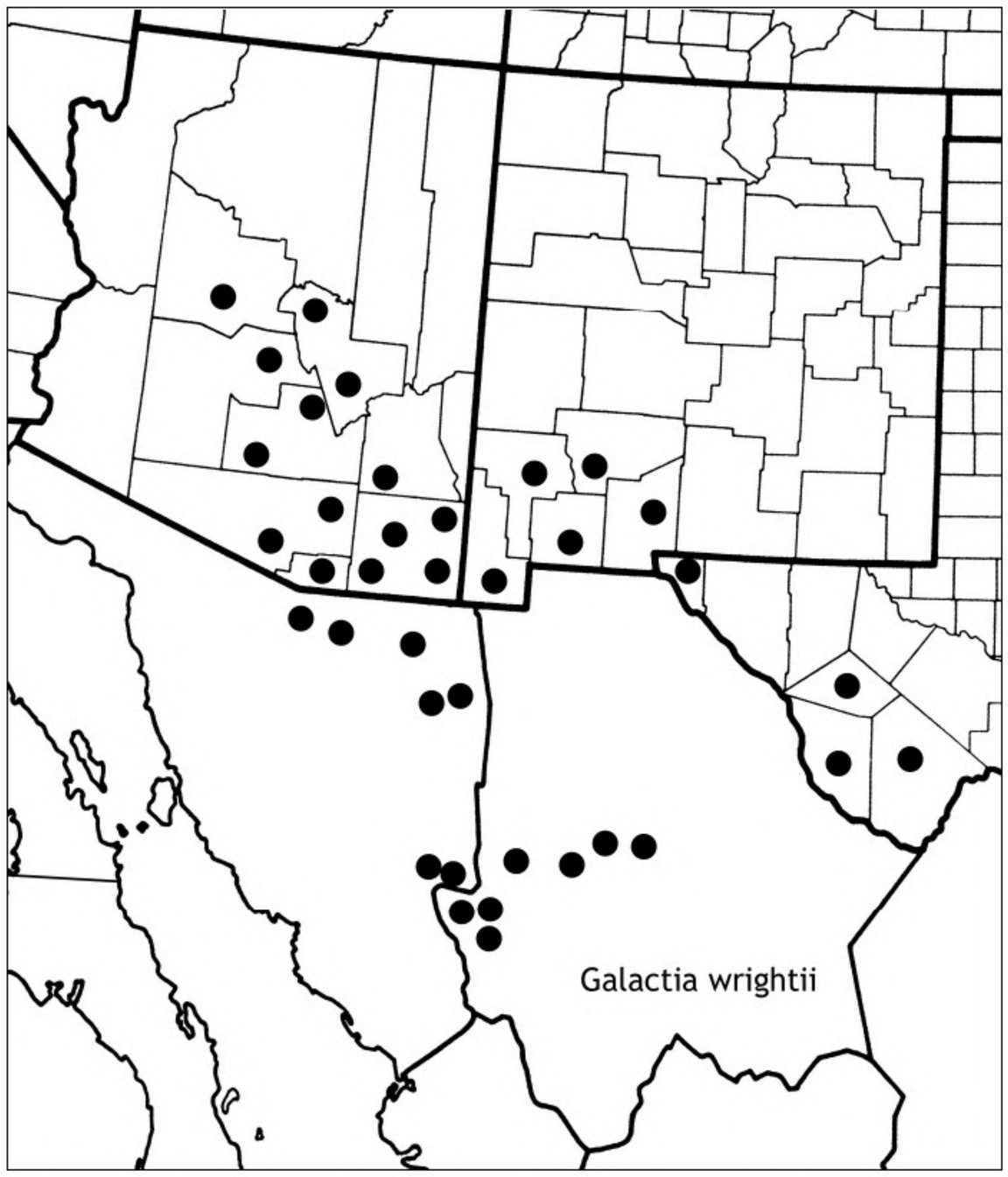

Galactia volubilis
(syns = G. macreei, G. glabella)

Map 12.


Galactia erecta

Map 13.

Map 14.



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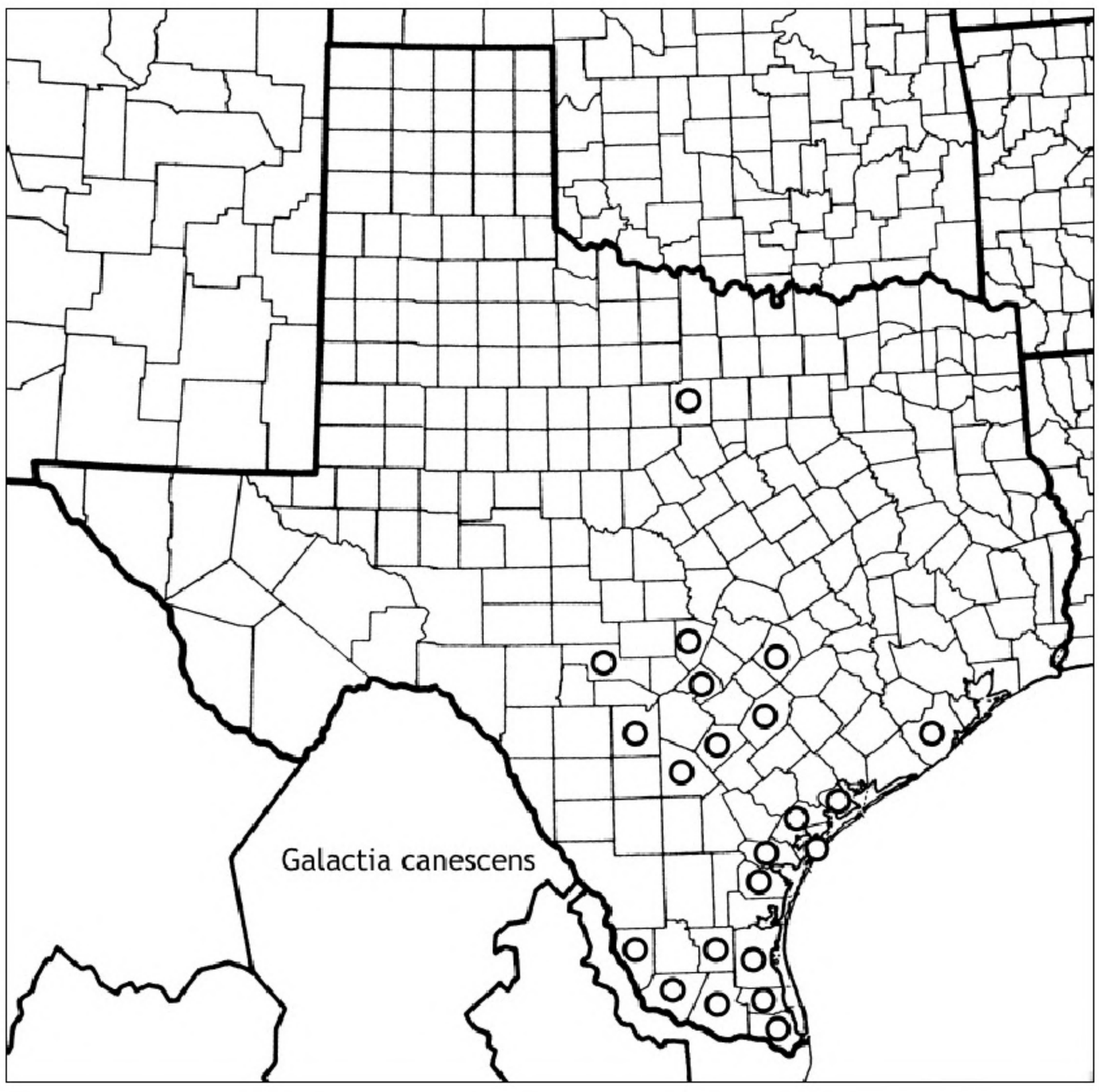

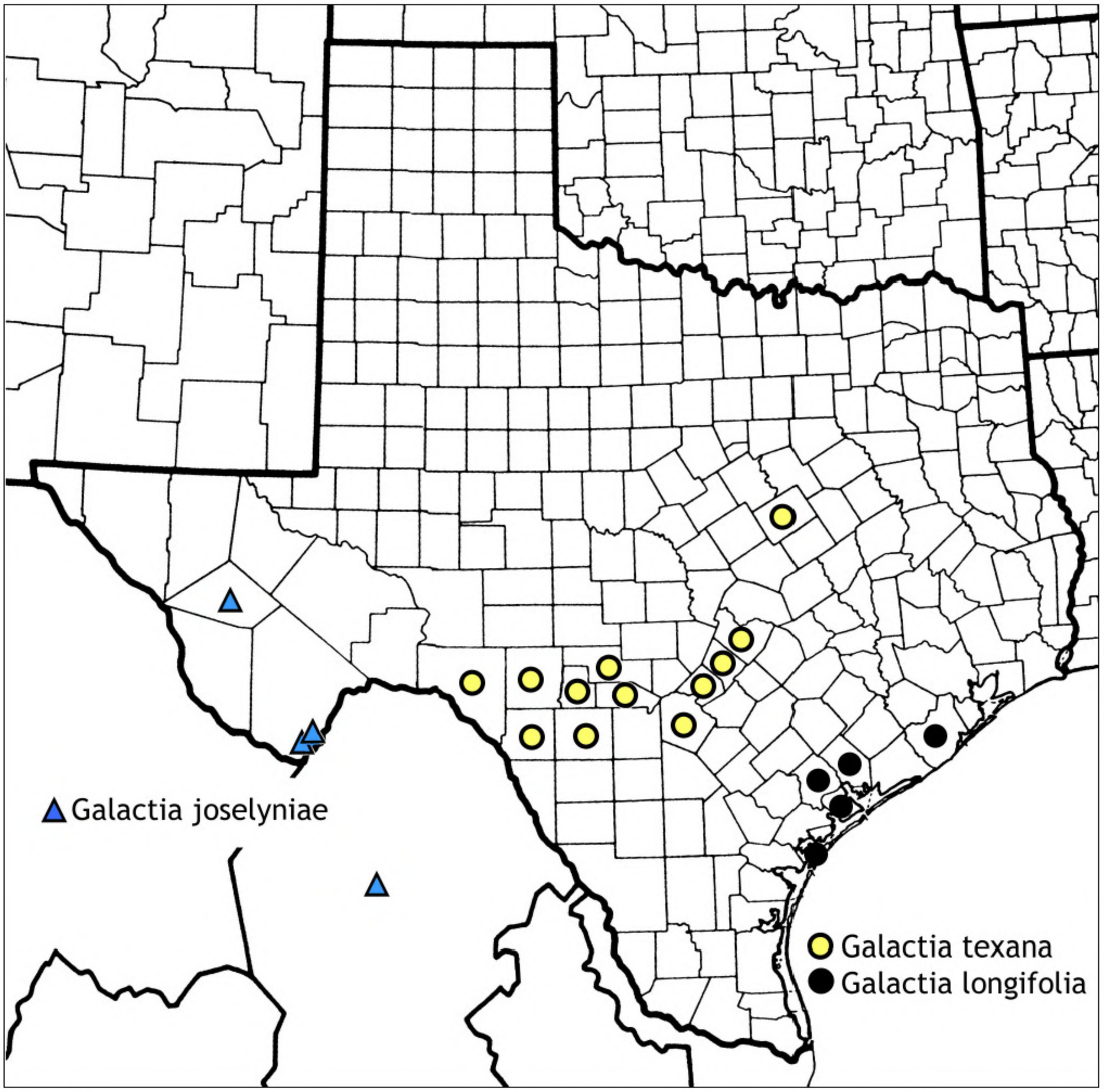
Galactia joselyniae
Galactia texana
Galactia longifolia

Map 16.